Better Homes and Gardens®

WOOD

THE MAGAZINE FOR HOME WOODWORKERS

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June 1985•ISSUE NO. 5
Display Until June 17

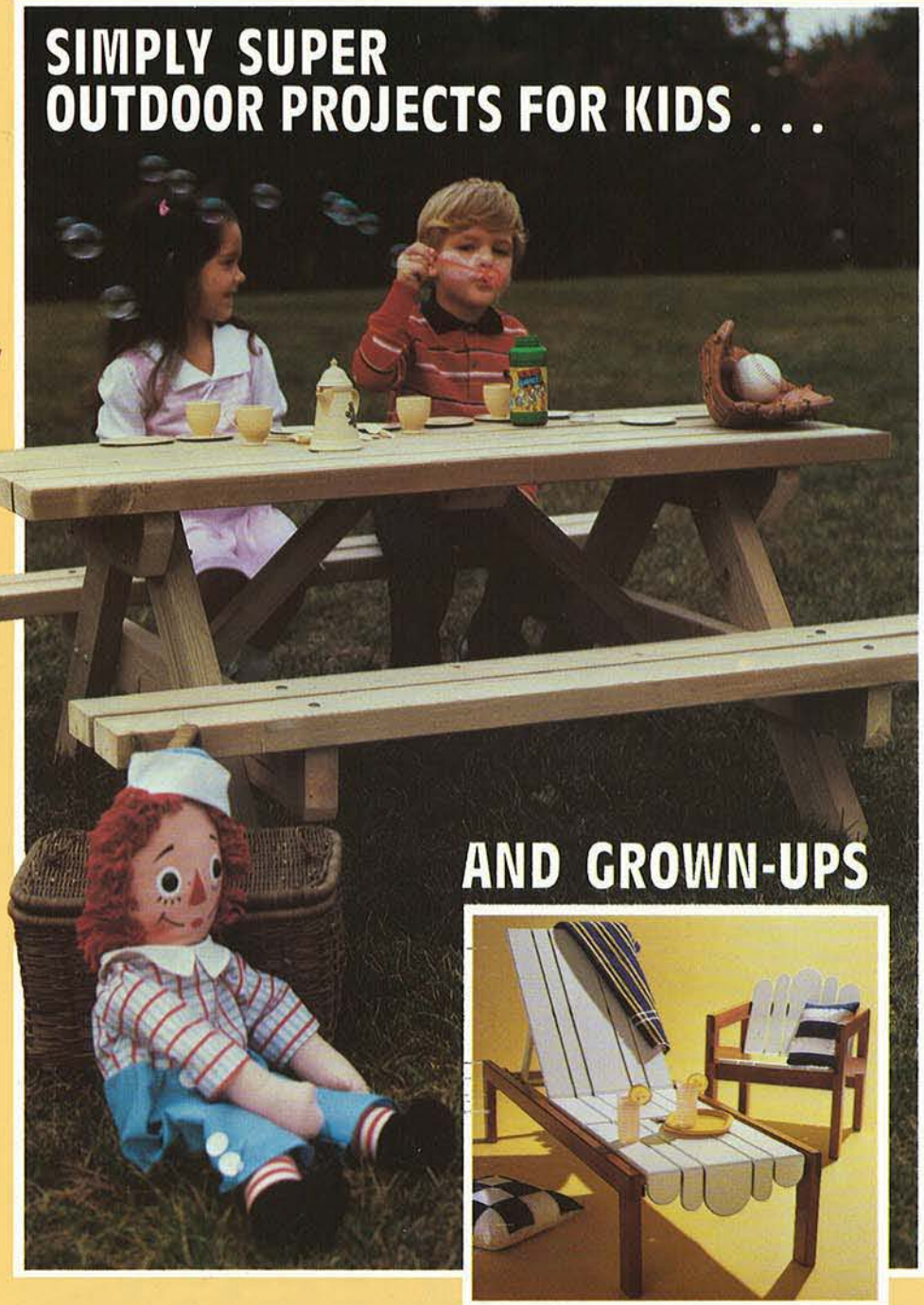
RAISED PANEL CONSTRUCTION
good, easy ways to do the job

BUYING A JIGSAW
how to spot quality
comparison chart
WOOD tests a dozen

COLONIAL FENCES
you can adapt or just admire

PROJECT HOW-TO
library table
homemade level
WOOD binder
and more

OUTDOOR FINISHES
what works best for your project



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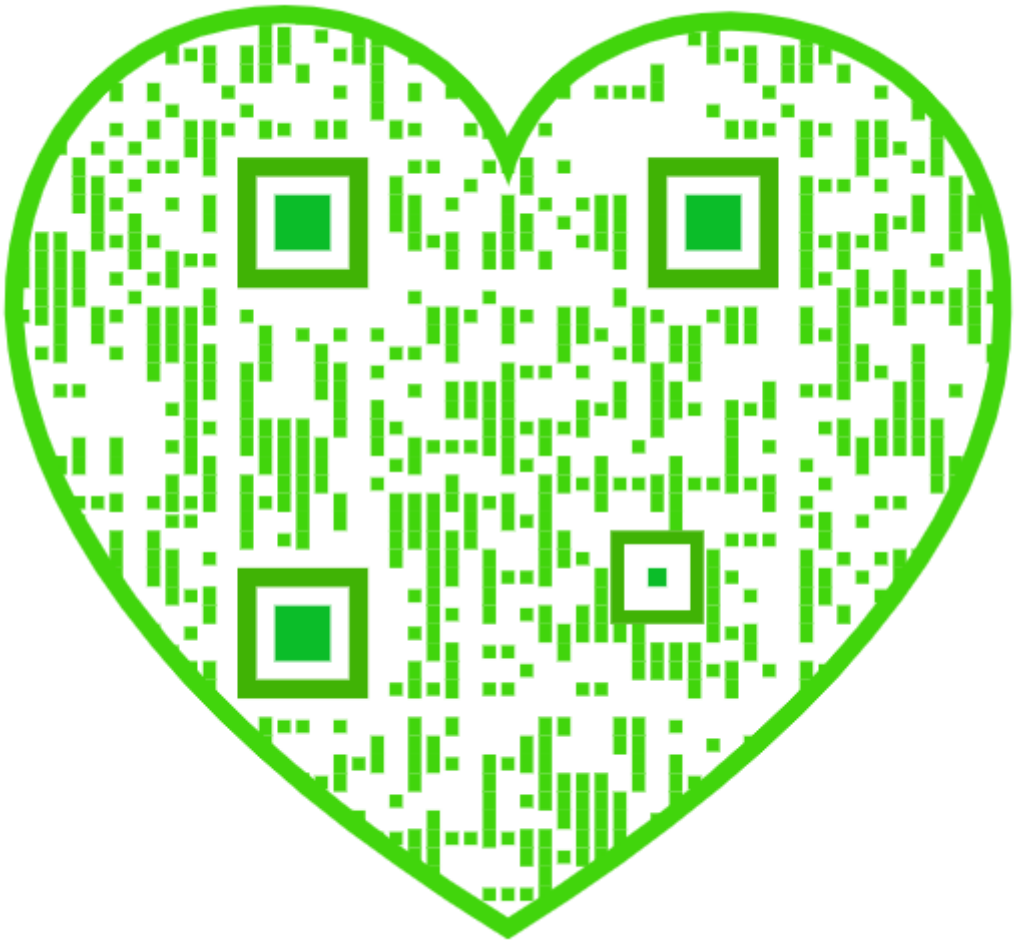

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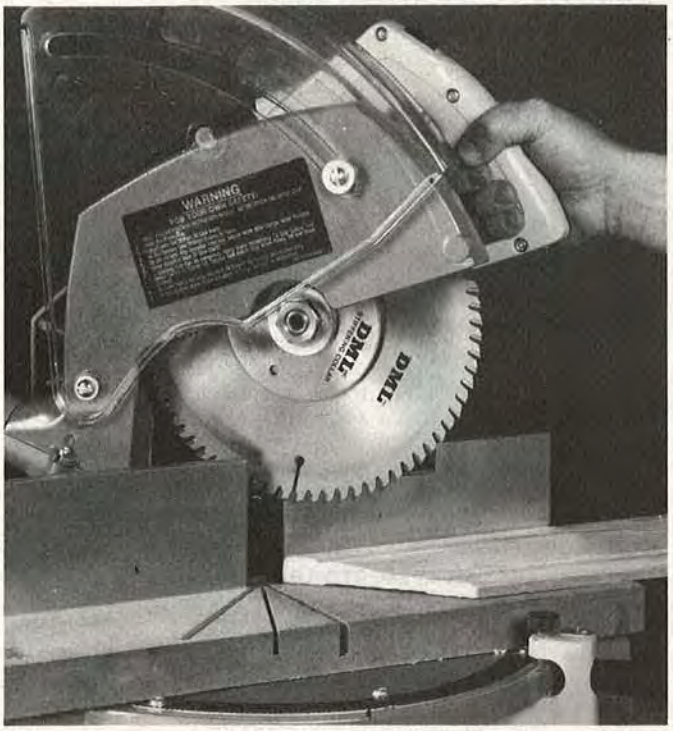

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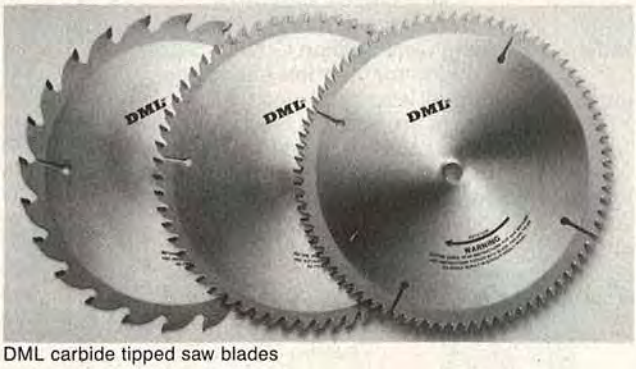

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THE MAGAZINE FOR HOME WOODWORKERS

June 1985 Issue No. 5

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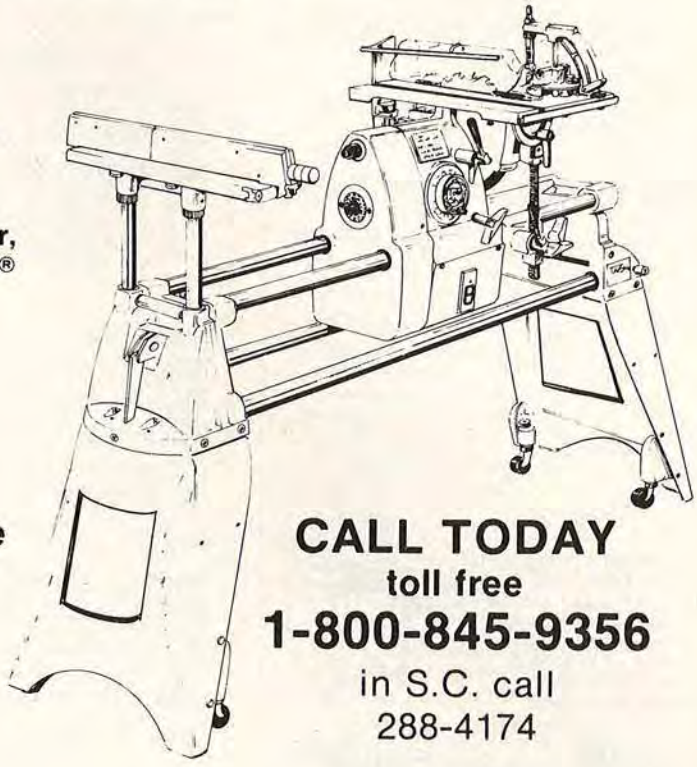

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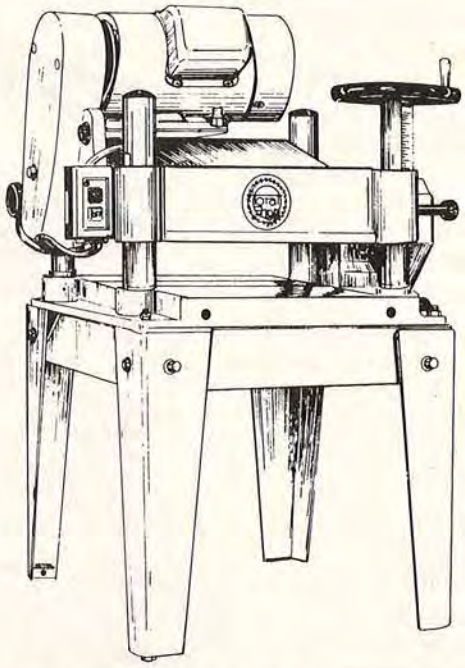

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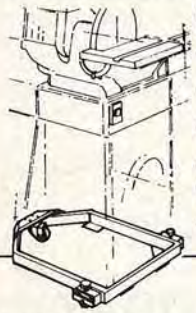

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WOOD

THE MAGAZINE FOR HOME WOODWORKERS

JUNE 1985 **ISSUE NO. 5**

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Before you buy, check our test results and comprehensive buymanship chart

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This heirloom level showcases the durability and beauty of two fine hardwoods

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BASIC RAISED PANEL CONSTRUCTION 43

Maybe you think that only the pros have the skills necessary to fashion distinctive, solid wood raised panels. Not so! This article takes you step-by-step through the process, from sizing the panel to final assembly

NOW YOU CAN BUILD IT

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After studying our shop-tested techniques, you'll want to try your hand at this distinguished-looking table. It's as hardworking as it is beautiful

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Colonial Virginia's Fence Law of 1705 left us with a legacy of classic fence styles to adapt and admire. Have a look . . .

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This distinctive three-ring binder project keeps back issues of WOOD at your fingertips for easy reference

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Woodworkers' Hardware ORDER FORM

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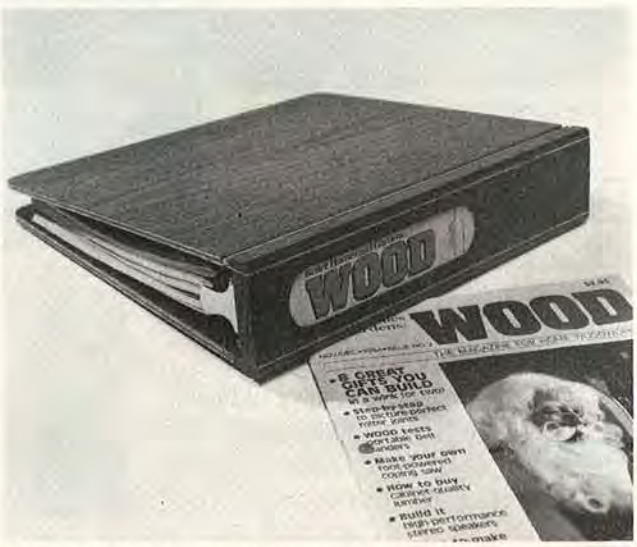
The Editor's Angle


WOOD
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8 GREAT GIFTS YOU CAN BUILD
WOOD tests portable belt sander's
Make your own router-powered coping saw
How to buy clear, high-quality lumber
Build it high-performance stereo speakers

The *WOOD* magazine three-ring binder, yours for the building. Now, you can keep your back issues in good condition in an attractive, durable package.

If you're like me, you probably take great joy in showing your finished woodworking projects to family and friends. After all, that's part of the satisfaction you get as a woodworker. That's why I'm so happy to be able to show you the *WOOD* magazine 3-ring binder. Though I didn't build it myself, I think it's pretty classy-looking. Hope you agree with me! We show you how to build it step-by-step on page 73. And if you send a stamped, self-addressed envelope to *WOOD* Binder, 1716 Locust Street, Des Moines, IA 50336, I'll make sure you receive our specially designed *WOOD* emblem FREE. You can glue it into the recess in the binder's spine.

• • •

I think by now you realize that we've got a bunch of pretty serious woodworkers here at *WOOD*. But I've got to admit that we do spend a considerable amount of time figuring out good, simple ways of getting the woodworking job done. In fact, that's what I think all of our jobs amount to: finding the best simple way to get a great result. That applies to the designs we present, the project write-ups, even the shop-tested techniques. Our goals are to clarify rather than confuse, make woodworking fun rather than taxing and tedious, and hopefully solve many of your woodworking problems in our shop so that they don't become problems for you. Sure, we make mistakes ourselves sometimes; as woodworkers, we all do. But I just wanted you to know that we're giving it our best shot in every issue.

Larry Clayton

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We welcome comments, criticisms, suggestions . . . even an occasional compliment. The volume of mail we receive makes it impossible to answer each and every letter, but we promise to do our level best. Send your correspondence to:

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PLAINS WOODWORKER

We sent a complimentary copy of WOOD to one of America's most famous woodworkers, and look what the mailman brought back!

Thanks for sending me the first copy of *WOOD* Magazine. I send you my best wishes for success with your new publication.

—Jimmy Carter, Plains, Ga.

Hmmm . . . we're wondering if President Reagan is a woodworker, too. We've seen photos of him chopping wood at the ranch—but what does he do with the stuff after that?

A WORD ABOUT PLANS

A number of *WOOD* readers have written to request project plans for everything from a curio cabinet to bedroom furniture. We aren't in the plan business, but a number of fine companies are. Check the "Information Worth Writing For" section in this issue, or head for your library or bookstore.

STALKING THE KNURLED NUT

10–24 Brass Knurled Nut

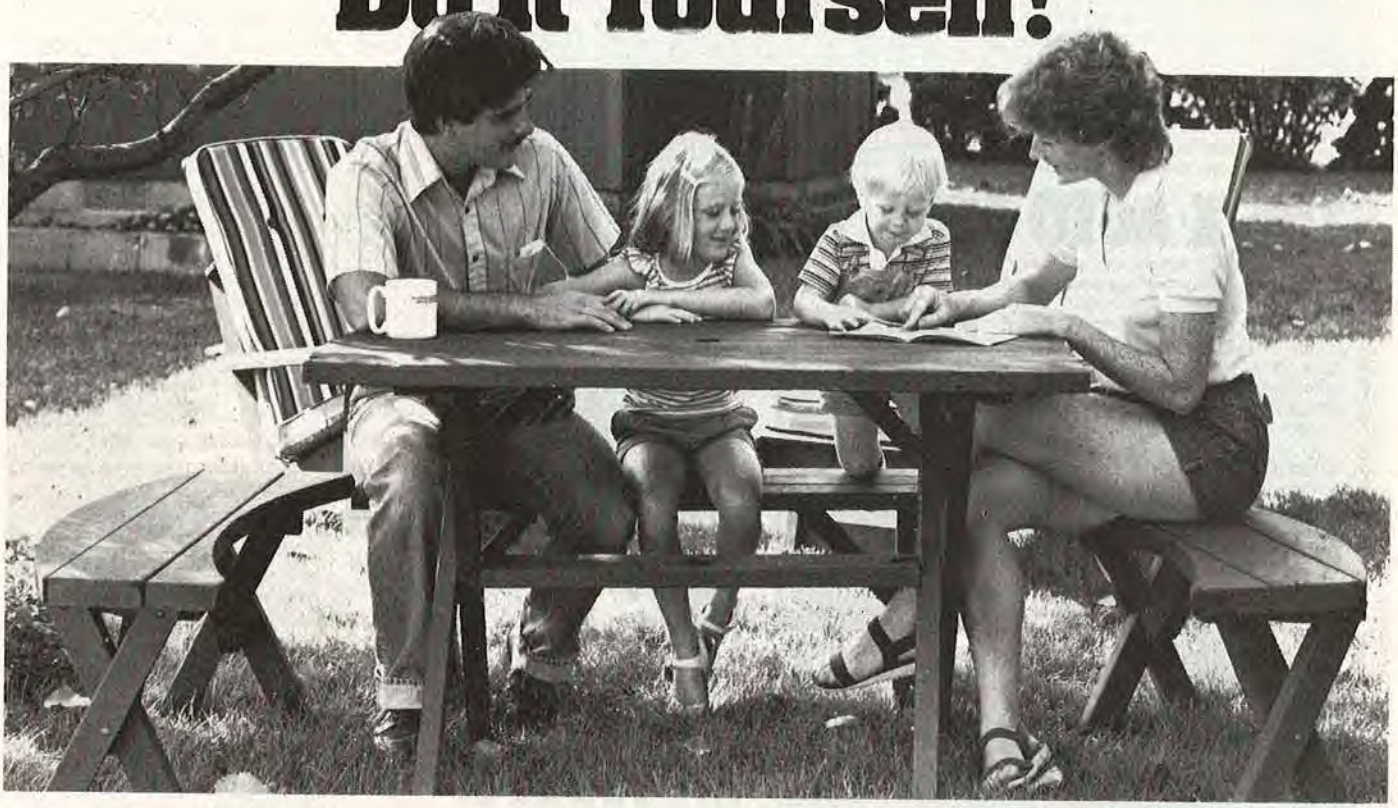
Remember that marking gauge we featured in the October, 1984 issue? Some folks were able to purchase the brass knurled nuts without difficulty. Others had problems locating them. Thanks to those who responded, we found these suppliers:

- Sigler's Machine, 8107 South C St., Tacoma, WA 98408. $5.80 for the three custom-tooled nuts, including postage.
- Elwick Supply, 230 Woods Lane, Somerdale, NJ 08083. $1.56 for three nuts, including postage.
- Northwest Precision Machine Works, 255 Rosewood Dr., Kalispell, MT 59901. $4.95 for three custom-tooled nuts, including postage.

(Be sure to specify 10–24, ½" O.D. brass knurled nuts.)

Continued on page 10

Do It Right, Do It for Less, Do It Yourself!



It's time to discover what millions already know: you can save money, improve the quality of your life and get better results when you do it yourself.

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TALKING BACK

Continued from page 8

THANKS, WE THINK

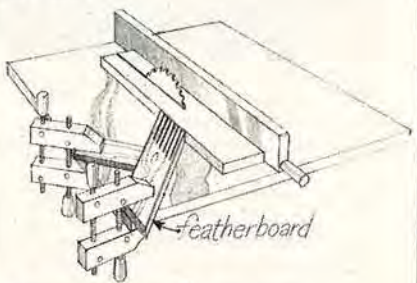
I love *WOOD* Magazine! When are you going to go monthly? It's very hard waiting two months between issues. [Regarding the workbench vise in our February issue] . . . perhaps the greatest idea since the invention of the pipe clamp. Keep up the great work!

—Daniel W. Porter, Sumter, S.C.

Thanks for the kind words to Maj. Porter and all the others who've written. But give us a break! We're doing our best to publish six quality *issues a year.*

THE FEATHERBOARD

In our "Wood Words" column in the February issue, we defined the term featherboard. However, the illustration showing the featherboard in use should have looked like this:



ONE MORE DADO SET

Here's another dado set we tested for the article in our February issue. It's the DML model CD800. Retail price: $215.00. The results of our shop test were favorable. This finely balanced dado set gave us a very clean, smooth cut while ripping solid oak and oak ply-

DML model CD800 test cut

wood. It did leave some slight chipping while crosscutting plywood, as did most blades tested.

MORE MAIL-ORDER SUPPLIERS

Add these mail-order wood suppliers to the list that appeared in our February issue:

- Wyndham Woods, Inc., P.O. Box 506, Ellettsville, IN 47429. Catalog: $1 (refundable with order). Specialties: exotic hardwoods and veneers.
- Artistry in Veneers, 450 Oak Tree Ave., South Plainfield, NJ 07080. Veneers only. Catalog: $1.50.

And here are a couple more hardware suppliers to add to our list from the February issue:

- Armor Products, P.O. Box 455, East Northport, NY 11731. Catalog: $1.
- Trend-lines, 375 Beacham St., Chelsea, MA 02150. Catalog: free.

SHOP SAFETY

We've had a number of letters about shop safety from alert readers who've commented on practices in some of our how-to photos. Sometimes it's essential to remove safety devices from power equipment in order to show what's happening in the photo. But make no mistake: We do take safety very seriously. One of the best letters we received on the subject of safety came from this wise reader.

I have a few simple rules for keeping my hands and fingers intact. I stay out of my shop when I am tired or upset. I enjoy a martini nearly every day, but only after I have finished in the shop for the day. I stop work and sharpen my tools as soon as they show any dullness. I keep my stationary tools on solid stands. If something I am about to do doesn't seem right, I stop and think about it. If I do something unsafe, I usually have a feeling beforehand that I shouldn't be doing it. ■

—Philip R. McCray, Ft. Washington, MD 20744

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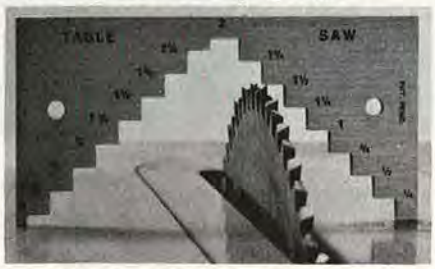
PRODUCTS THAT PERFORM

Print this article

No-nonsense scraper

When Woodworker's Supply of New Mexico couldn't find a glue scraper they liked, they had one made for their customers. Running this scraper over those oozing and meddlesome glue runs saves finishing time and expensive sanding belts. The heat-treated blade should stand up to a lot of abuse, but all four sides can be resharpened. Holes in the iron handle make hanging easy. Our scraper cost $19.95 (shipping included) through Woodworker's Supply of New Mexico, 5604 Alameda, NE, Albuquerque, NM 87113.

Cut steps with step gauge



Keep this time saver near your radial arm or table saw and you'll be amazed how it cuts calibration time. With this step gauge, you can quickly and accurately set the depth of your cut from ⅛ inch to 2¼ inches. This lightweight metal gauge also comes in handy for setting the depth of dado cuts and rip fence distance. You can even use it as a straightedge and square. It's available through selected catalog sources and retail outlets. We ordered our step gauge for $12.46 (include shipping) through Liechtung, 4944 Commerce Parkway, Cleveland, OH 44128.

The razor's edge on wheels

This rolling guide takes most of the guesswork out of maintaining the proper angle or bevel on your chisels and plane irons up to 2⅝ inches wide. The threaded post in the back quickly adjusts to the proper angle. Use this tool with any abrasive stone or sharpener. It's made by General Hardware Manufacturing, 80 White Street, New York, NY 10013, and is available through retail outlets and catalog sources. We ordered ours for $15.00 (postage included) through Woodcraft, 41 Atlantic, Box 4000, Dept. W., Woburn, MA 01888.

PRODUCTS THAT PERFORM

Bin disorganized?

Then get your act together! You can organize quite a collection of items at your fingertips with these wall-mounting storage bins. When it's time to grab an item, the polystyrene bins conveniently swing 180 degrees. Each of the 10 bins is 9 inches long and 1 inch deep; removable dividers make four tidy compartments in each bin. The Swing Bin is available for $19.45 (shipping included) through the Brookstone Co., 638 Vose Farm Road, Peterborough, NH 03458.

Fingertip protection

We all like to feel the wood and tools when finishing—often at the expense of sensitive fingertips. Guard-Tex, a surgical gauze impregnated with natural rubber, provides no-fuss protection from blisters, splinters, and cuts without sacrificing a sense of touch. The ¾-inch-wide tape has no messy adhesive and improves your grip. This product from General Bandages, Inc., of Morton Grove, Ill., now is available through selected catalog sources. We ordered eight 30-yard rolls for $12.50 (including shipping) through Woodcraft, 41 Atlantic Ave., P.O. Box 4000, Dept. W., Woburn, MA 01888.

Continued on page 15

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CS-112

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WC-104, Set Includes: 1/4", 1/2", 3/4", 1". $29.90.

Carving Tools

CS-112 (shown above), Set Includes: 3/8" Straight Chisel —, 3/8" Skew Chisel —, 1/4" Flat Gouge —, 5/16" Gouge —, 3/16" Spoon Gouge ⌣, 1/2" Gouge ⌒, 1/4" Gouge ⌣, 3/16" Gouge ⌄, 3/8" Gouge ◡, 3/8" Gouge ⋁, 1/8" Gouge, ⌄, 1/4" Parting Tool ⋁. $139.90.
CS-106, Set Includes: 3/8" Straight Chisel —, 1/2" Gouge ⌒, 1/4" Gouge ⌣, 3/8" Gouge ◡, 1/8" Gouge ⌄, 1/4" Parting Tool ⋁. $74.90.
CM-100, (shown above) Carver's Mallet: Oak Handle, Beechwood Head, Wt. 15 oz. $9.90.

Turning Tools

TT-108 (shown above), Set Includes: 1/2" Diamond Point, 1/2" Round Nose, 1/2" Parting Tool, 1/2" Skew, 1" Skew, 1/4" Gouge, 5/8" Gouge, 7/8" Gouge. $67.90.

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PRODUCTS THAT PERFORM

Continued from page 13

Clearly convenient

Someone out there probably is thinking up even more ways to use the Mite-R-Gage made by Nowlin, Inc. of Columbus, Ohio. This combination protractor and bevel can lock onto inside or outside angles to ½-degree accuracy. Among other uses, you can lay out or match simple and compound miters, check squareness and flatness, and calibrate radial arm and table saws. The tool is available through many catalog and retail sources. Ours came from U.S. General, 100 Commercial St., Plainview, NY 11803 for $19.54, including postage.

Cut the chatter

The words "extra heavy" accurately describe this set of six English-made scrapers from Sorby. We weighed the left skew: It's a hefty 1½ pounds. Sorby's production is limited and availability is uneven at times, but it's worth the wait. Each tool measures about 19 inches long. Scrapers also are available individually. We ordered our set for $104.95 (including shipping) from Wood Carvers Supply Inc., P.O. Box 16411, Minneapolis, MN 55416. The newest tools from England have clear lacquered handles.■

CONOVER

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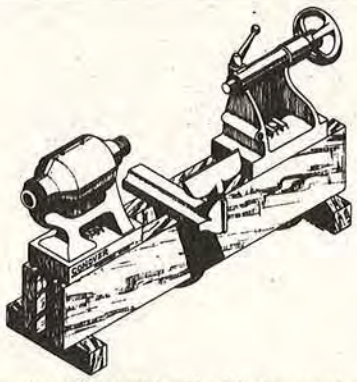

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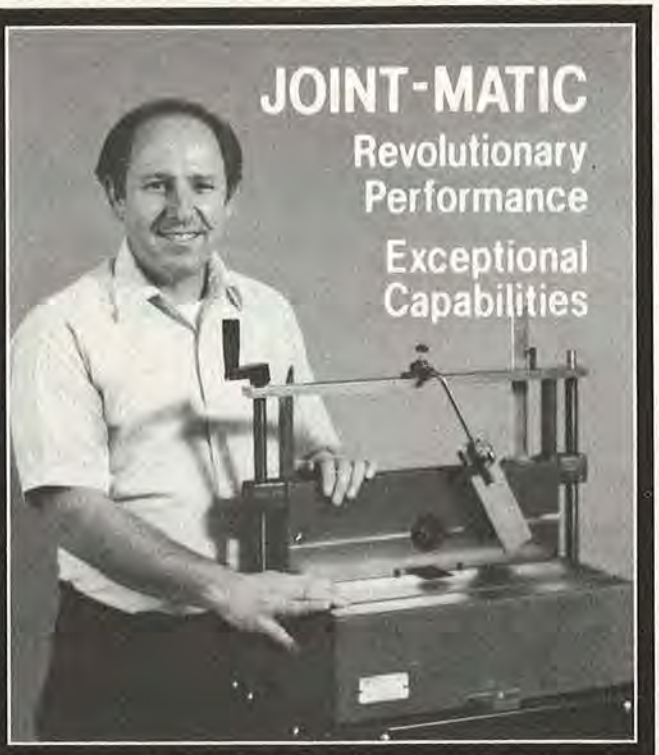

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- Built for ruggedness and rigidity the table and slide unit have extra deep ribbing allowing a more accurate and chatter free cut.
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- The adjustment screws are rolled thread with a thread pitch of 3/4-16.
- Accuracy can be achieved to as close as .001th of an inch.
- Comes equipped with a 1-3/4 H.P. router.

For Your Brochure Please Send $2.00 to:

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Joint-Matic Machine Is Protected By U.S. Patent 4,163,465

Print this article

ASSOCIATIONS YOU SHOULD KNOW ABOUT

Woodworkers comprise a vast fraternity, generously sharing of their knowledge, skills, and experience. One of the best ways to tap this expertise is through the associations we spotlight in each issue of *WOOD*.

NATIONAL WOOD CARVERS ASSOCIATION

With the motto "Some carve their careers, others just chisel," a few whittlers, concerned that carving was dying out, founded the National Wood Carvers Association in 1953. Today, there are 25,000 members throughout the U.S. and 45 countries from Australia to Zimbabwe.

Unlike some organizations, NWCA is loose-knit and laid-back, with no formal national conventions, meetings, or tightly phrased bylaws. Election of officers, held every three years, is by mail-in ballot. But when NWCA promises to do "anything that aids the carver," they honestly try to deliver.

Magazine for members

Within the pages of *Chip Chats*, NWCA's bimonthly magazine, readers find answers to carving questions, project designs, solutions to carving problems, craftsmen profiles, hints on techniques, news of shows and events, lists of suppliers, and lots of personal attention.

Editor Ed Gallenstein crams all he can into each issue to promote wood carving and encourage fellowship among members through exhibitions and get-togethers. Gallenstein provides information on tools and suppliers, and finds markets for those who sell their work. He personally handles—clearinghouse fashion—queries that won't fit into an issue.

Chip Chats offers 40 informative pages, many with color photographs, that are the lifeline tying together NWCA membership. To carvers in the association's nearly 300 affiliated clubs, the magazine *is* NWCA. Through it, they share ideas, concerns, and receive recognition. As the only full-fledged magazine devoted to wood carving, *Chip Chats* has become their podium.

How to join

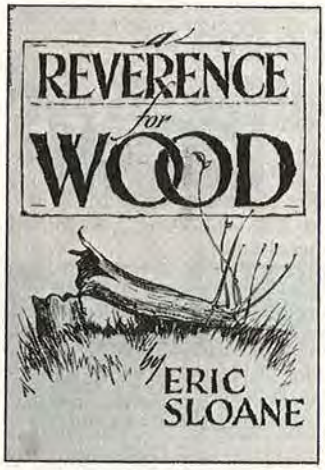
Anyone who whittles or carves, amateur or professional, or who simply has an interest, can join NWCA.

Phrased in typically offhand fashion, their brochure states: "Should you decide to risk a year's membership dues, fill out the application blank and send it along with your five bucks . . ."

For the $5 annual dues, you receive *Chip Chats* and "rewarding and enriching" fellowship. For more information, a membership application, and a few sample pages from the magazine, write: National Wood Carvers Association, P.O. Box 43218, Cincinnati, OH 45243. ■

A Reverence for Wood

By Eric Sloane. Ballantine Books, New York, New York. © 1965 by Wilfred Funk.



112 pages.
$5.95

Taking down a 200-year-old barn in Connecticut provides the initial action and setting for this charming little book, which is richly illustrated with dozens of pen and ink drawings. Shunning "modern methods"—a bulldozer and cables—Eric Sloane and his knowledgeable New England helper, Harley, use wrecking bars and other hand tools to salvage the antique wood.

At almost every step of the way, Sloane finds anecdotes or insights about the ways colonial settlers and other early Americans used wood. For example, in the 1700s most shingles came from white cedar swamps in New Jersey. These woodlands had been depleted by the 1800s, but loggers discovered a layer of the cedars submerged in the swamps, so they *mined* white cedar logs until the Civil War.

Besides being the principal material for shelter and tool-making, wood was the major heating fuel and even played a role in the nineteenth-century metalworking industry. The only coal available for iron production and blacksmithing was charcoal, produced by a strange breed of people who plied their trade deep in the woods.

If you enjoy early American lore, especially about woodworking, this little book will delight you with at least one evening's good reading.

"The sound of an ax cutting into soft pine is very different from the sharp ping of hardwood being cut; even the sharpness of a blade produces a certain sound to the ear of an expert."

"Wood . . . spanned rivers for man; it built his home and heated it in the winter; man walked on wood, slept in it, sat on wooden chairs at wooden tables, drank and ate the fruits of trees from wooden cups and dishes. From cradle of wood to coffin of wood, the life of man was encircled by it."

NEW! *Woodmaster* Variable Speed Power-Feed

PLANER/MOLDER JOINTER/SANDER

SAVES YOU MONEY! Put this versatile power-feed tool to work in your own shop. See how fast it **pays for itself!** Quickly converts low-cost rough lumber into valuable finished stock. Turns out perfect quarter-round, casing, base mold, tongue & groove . . . all popular patterns . . . any custom design. Joints super-true edges, squared stock, bevels and chamfers.

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Produces tongue & groove with one set-up, two boards in same pass.

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Or Phone 1-800-824-7888 Oper. 642

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Note: Under 35.00 add $2.00 per order. Extra charge to Alaska & Hawaii on stationary machines. Misprints are subject to correction. This ad expires June 30, 1985. Watch for our next ad.

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Examine any item in your home or shop. If it's not what you expected, return it in original condition for a full refund.

Free with any order:
- 1 Year (3–4 issues) catalog subscription
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New! Freud tool sets

4 Pc. Chisel Sets	19.95
6 Pc. Chisel Sets	31.75
10 Pc Chisel Sets	52.95
8 Pc. Lathe Set	53.95
6 Pc. Carving Set	59.50
12 Pc. Carving Set	111.50

Free Wooden Case

MAKITA TOOLS

1100	3 3/4" Planer Kit	$199.50
1805B	6 1/8" Planer kit	264.95
1900BW	3 1/4" Planer w/cs	94.95
2030	12" Planer/Jointer	1345.00
2040	15 5/8" Planer	1175.00
2400BW	10" Miter Saw w/bld	248.95
2401BW	10" Miter Saw w/blade w/electric brake	205.00
2708	Table Saw	228.95
3601B	Router	119.95
3608BK	Router w/cas	84.95
3612BR	3 H.P. Router	179.95
3700B	Laminate Trimmer	84.75
4200N	4 3/8" Circular Saw	94.95
4301BV	Vr.Sp.Orbital Jig Saw	128.95
5007NB	8 1/4" CircularSaw	98.75
5008NB	8 1/4" Circular Saw	109.95
5012B	12" Chain Saw	119.95
5081DW	3 3/8" Cord. Saw	108.95
5201NA	10" Circular Saw	219.00
5402A	16" Circular Saw	374.50
6000R	Uni–Drill	109.50
6010DL	Cordless Drill w/charger light & case	99.95
6010DWK	Cordless Drill w/charger & case	99.95
6010SDW	3/8" Rev. Cordless Drill	48.95
6012HDW	Cord. Drill Kit 2–Sp.	108.95
6510LVR	3/8" Drill–Rev.	73.50
6710DW	Cord. Screwdriver	109.50
6800DBV	Drywall Screwdriver	88.95
9030	1 1/8"x21" Belt Sander	129.50
9035	Finishing Sander	48.00
9045B	Finishing Sander	99.95
9045N	Dustless Sander	107.95
9207SPB	7" Sander Polisher	139.95
9401	4"x24" Belt Sander	165.00
9501BKT	4" Sander Grinder Kit	89.95
9900B	3"x21" Belt Sander	123.95
9924DB	3"X24" Belt Sander	139.75
BO4510	Finishing Sander	46.95
BO4530	6" Rnd Finish Sander	57.95
DA3000	3/8" Angle Drill	104.75
DA300DW	Cordless Angle Drill	104.75
DK1001	Drill (6010D), Charger & Vacuum Cleaner	124.50
DP3720	3/8" Reversible Drill	59.95
DP4700	Drill Revisible	95.95
GV5000	Disc Sander	54.95
HP1030	Hammer Drill	107.50
JG1600	Jig Saw single Sp.	97.50
JR3000V	Recipro Saw	124.95

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	Each	Pkg 6
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No. 52 1/2" Pipe Clamp	6.05	5.60 ea
No. 1215 (WEB) 15"	6.80	6.35 ea
No. 7456 Clamp Pads	2.95	2.50 ea

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(Heavy Duty)		Each	Pkg. 6
No. 7224	24"	17.30	15.70 Ea.
No. 7230	30"	18.10	16.45 Ea.
No. 7236	36"	18.70	16.95 Ea.
No. 7248	48"	20.75	18.70 Ea.
No. 7260	60"	22.65	20.55 Ea.
No. 7272	72"	24.55	22.25 Ea.

JORGENSON CLAMPS (Med Duty)

No. 3712	12"	5.90	5.35 Ea.
No. 3724	24"	7.30	6.60 Ea.
No. 3730	30"	8.20	7.40 Ea.
No. 3736	36"	8.85	7.95 Ea.

JORGENSON HAND SCREWS

No. 3/0	3"	$8.45	7.60 Ea.
No. 0	4 1/2"	9.90	8.90 Ea.
No. 1	6"	11.30	10.15 Ea.
No. 2	8 1/2"	13.45	12.15 Ea.

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No. 4512	12" Open	17.45	15.70 Ea.
No. 4524	24" Open	20.85	18.85 Ea.
No. 4530	30" Open	21.90	19.65 Ea.
No. 4536	36" Open	22.90	20.60 Ea.

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No. 1623	3" Hold Down	7.50	6.30 Ea
No. 3202HT	2" Spring	2.15	1.90 Ea

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B7075	3X21 Belt Sander	$125.00
B7200A	4x24 Belt Sander	189.95
BD1020R	3/8" Cordless Screw driver	109.50
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E3800A	Drywall Screwdriver	99.95
JSE–60	Electronic Jigsaw	149.95
L–120U	3 5/8" Planer	105.95
L1323A	1/4" Planer	139.95
LS–35	Finishing Sander	59.95
L–580	6 1/8" Planer	249.95
R–150	1 HP Plunge Router	109.95
R–330	2 HP Router	159.95
R–500	3 HP Plunge Router	189.95
S500A	3x51/2 Finishing Sander	46.95
TR–30	Laminate Trimmer	99.95
TS–251UB	10" Miter Saw w/Freud LU85M10 Blade	229.95

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0234–1	1/2" VSR Drill	114.90
0375–1	3/8" Rev. Angle Drill	117.75
1107–1	1/2" VSR D Handle	144.95
5660	1 1/2 HP Router	184.50
5680	2 HP Router	219.75
5935	4"X24" Sander	214.90
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6507	Sawzall w/case	124.95
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6543–1	1/4" Screwdriver	149.95
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Carbide Tipped 12"=1" Bore

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LU73M10	10"	60	Cut–Off	35.70
LU73M12	12"	72	Cut–Off	76.90
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LU82M12	12"	72	Cut–Off	85.95
LU84M11	10"	50	Comb.	37.70
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LM72M10	10"	24	Ripping	36.95
DS306	6"	Dado		94.75
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SUN GOLD SANDING SHEETS

9X11 Aluminum Oxide C Weight

Grit	Pk of 100
150, 120, 100	$21.95
80	23.70
60	28.90
50	32.05
40	38.30

All Freud router bits on sale

9x11 Non–Loading Silicon Carbide

Grit	A WEIGHT	Pack of 100
400, 360, 320, 280, 240, 220, 180, 150, 120		$19.60

BLACK AND DECKER INDUSTRIAL TOOLS

1165	3/8" Angle Drill	$119.50
1179	3/8" VAR. Sp. Drill	74.95
1180	3/8" VSR Holgun®	105.00
1575	3/8" VSR Scrudrill®	119.50
3051	7 1/4" Wormdriver Saw	148.95
3091	10" Miter Saw	199.95
3103	2 Sp. Cut Sawkit	109.95
3105	Var. Sp. Cut Sawkit	119.95
3107	Var. Sp. Orbital Cut	129.25
3265	Laminate Trimmer	145.65
3310	1 1/2 HP Router	145.00
3370–10	3 1/4" Planer	129.95
4010	Palm Sander	48.95
4247	4 1/2" Disc Sander/ Grinder	69.95
6750	Heat Gun	69.75

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B600–A	14 1/2"BandSaw	$1535.00
CJ65VA	Electronic Jig/saw	149.95
CR10V	Reciprocating Saw	119.95
C6DA	6 1/4" Circular Saw	159.95
C7SA	7 1/2" Circular Saw	69.95
C10FA	10" Miter Saw w/ vise ext.	325.00
C10FB	10" Miter Saw	194.50
C12Y	12" Table Saw	1395.00
D10VC	3/8 Rev. Drill	49.95
DRC–10	Cordless Screwdriver	89.95
F1000A	Planer/Jointer	1315.00
P50	6 5/8" Planer	325.00
P100F	12" Planer	1040.00
SB–110	4x24 Belt Sander w/dust bag	199.95
SO–110A	1/2 Sheet Sander	119.95
SB–75	3x21 Belt Sander –2 Sp.w/dust bag	132.75
SB8T	3x24 Belt Sander 2–Sp w/dustbag	165.00
TR–6	Laminate Trimmer	99.95
TR–8	1 HP Plunge Router	149.90
TR–12	3 H.P. Plunge Router	173.50
W6V	Screwdriver	107.50

SUNGOLD X – WEIGHT SANDING BELTS

Sold in packs of 10 only Outlasts regular belts 2 to 1

Size	Grit	10 Belts	50 Belts
3"x21"	120	$.98 ea	$.84 ea
	100	1.00 ea	.86 ea
Assortment of	80	1.05 ea	.92 ea
10 $12.95	60	1.07 ea	.94 ea
	50	1.10 ea	.96 ea
	40	1.20 ea	.93 ea
3"x24"	120	1.22 ea	.97 ea
	100	1.26 ea	1.12 ea
Assortment of	80	1.31 ea	1.15 ea
10 $13.95	60	1.34 ea	1.18 ea
	50	1.68 ea	1.46 ea
4"x24"	120	1.73 ea	1.51 ea
	100	1.78 ea	1.64 ea
Assortment of	80	1.85 ea	1.70 ea
10 $18.95	60	1.89 ea	1.76 ea
	50		
	40		

PORTER CABLE

100	7/8 HP Router	$87.95
167	Block Plane	85.95
309	Laminate Trimmer	79.95
314	4 1/2" Trim Saw	114.95
330	Palm Finish Sander	55.95
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360	3x24 Belt Sander w/bag	179.75
362	4x24 Belt Sander w/bag	189.95
505	Finishing Sander	104.75
518	3 H.P. Electronic Router	324.80
690	1 1/2 H.P. Router	129.95
695	1 1/2 H.P. Router/ Shaper	210.50
696	Router/Shaper Table only	109.75
3151	7 1/4" Circular Saw	119.50
9627	2 Sp. Tiger Saw Kit	119.95

TITEBOND WOOD GLUE

$5.75 Qt. $12.95 Gal

Watco Danish Oil
Natural, Medium, Dark, Black, or Colors
$5.70 Qt. $17.65 Gal

Free carbide blade with Delta Contractor's Saw, Sawbuck and Mitre Saw!

DELTA UNISAW 1/2 h.p. Motor $1199.00 w/free carbide blade (Limited quantities. Offer subject to withdrawal at any time.)

WOOD DOWEL, BUTTON AND PLUG KIT Six bins filled with 600 3/8" and 1/2" dowels, plugs and buttons plus a free dowel center set.
DWKIT $19.95

SQ. RECESS SCREW KIT Six bin unit with 600 #8 woodscrews from 1" to 3", plus screwdriver and power drill bit.
SCDKS $19.95

BLACK & DECKER MAIL IN REBATES

Model	List	Our Price	Rebate	Your Cost
1179 3/8" Drill	116.00	74.95	10.00	64.95
3103 Cut Saw	167.00	109.95	10.00	99.95
4010 Palm Sander	82.00	48.95	10.00	38.95
4247 Disc Grinder	105.00	69.95	10.00	59.95

Offer good through June 29, 1985

RYOBI 10" MITER SAW W/FREE FREUD LU85M10 CUT-OFF BLADE! Includes vise assembly, extensions and dust bag.
$229.95 ppd

TS-251UB

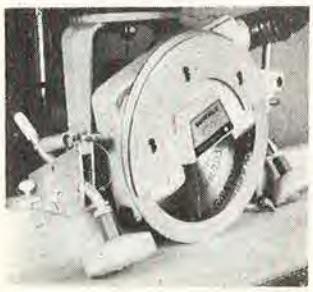
FREUD 7¼" BLADE SET 3 pc. set with teflon coating. 12 tooth rip, 24 tooth general purpose, 40 tooth fine cutting.
$59.95 ppd

TFL7

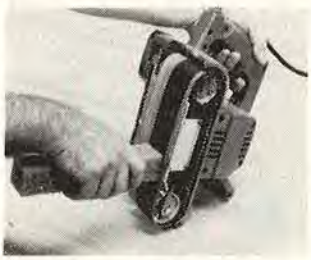
Print this article **WOOD** ☑

Father's Day Gift List

Father's Day is June 16. Check the items you want, tear out this section and casually leave it where your family can find it. They'll get the hint!



☐ SHOPHELPER™ SAFETY GUIDES infeed wheel holds material down guarding against chatter and kickback as material enters the cut; the outfeed wheel holds stock until it is clear of the cutter. Wheels utilize a single direction bearing. Mounting brackets allow easy interchangeability between machines. Set, complete with pair of brackets, $79.50. To order or for the name of your nearest dealer call: 800-344-7455, in CA: 800-828-8833.



☐ This 1⅝" × 8" crepe rubber sanding belt or disc cleaner eliminates loading and saves you time and money. Cleaner lasts for ages, even under heavy use. $12 ppd. (woodworker's catalog free with cleaner. Catalog available separately for $1.00). MORGAN WOODWORKING SUPPLIES, Dept. W06M05, 1123 Bardstown Rd., Louisville, KY 40204.

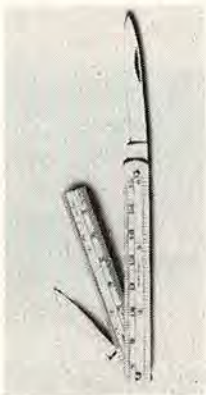
☐ Edlco is offering a bundle for Father's Day: 10 board feet of ⅜" shorts, 3" and wider, 18"-36" long in cherry, oak or walnut. Bargain priced bundle includes a "How To" project book *and* top-grade lumber catalog! Only $39.95 delivered. Offer good through June 16th only. Specify species and send check or money order to EDUCATIONAL LUMBER COMPANY, Box 5373 W, Asheville, NC 28813.

☐ Give a tool to be proud of ... a Bosch Jig Saw for all types of construction. The Bosch 1581VS has adjustable orbital action for straight metal, ceramic or glass cutting or full orbital action for fast cutting of softer materials. Only $135. AVIATION INDUSTRIAL SUPPLY, 3900 Ulster Street, Denver, CO 80207.

☐ Crafted of 1" thick solid walnut, the clock body is pre-sanded and milled for the movement recess. No tools or experience are needed for assembly; simply attach the movement and numerals and apply the finish of your choice. 11" diameter. 30 day money-back guarantee. CASKER CO., Box 2347, Cincinnati, OH 45201.

☐ New Lufkin XL-33 with exclusive teardrop case that conforms to shape of hand. Cushion tread for comfort, impact-resistance. Positive-action lock in true working position of thumb. Improved shock absorber to protect end hook. Extra-wide viewing angle. Blade, 1" × 33'. THE COOPER GROUP, PO Box 728, Apex, NC 27502.

☐ This personalized solid bronze branding iron in either a flame or electrically heated style for use on wood, leather, etc., makes a unique, practical, and distinctive gift that will give a lifetime of service and satisfaction to the user. For more information, contact TURNING POINT, INC., Box 9303-F, Fargo, ND 58109. 701-645-2319.

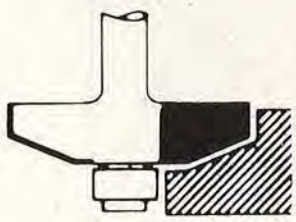


☐ Combination pocket knife and precision rule. A very slim, two-bladed knife in a polished stainless steel case together with a 6" folding precision rule graduated in 64ths. Overall size 3" × ⅝" closed. Weighs only a few ounces. A wonderful gift. $29.90 ppd. GARRETT WADE CO., 161 Ave. of the Americas, New York, NY 10013.

WOOD

Father's Day Gift List

☐ No longer will he have an excuse for not completing projects because he doesn't have a lathe. Conover's 16" Lathe Set features a heavy duty lathe with unlimited center length at an affordable price. Our catalogue of unique tools and machinery, $1. CONOVER WOODCRAFT SPECIALTIES, INC., 18125 Madison Road, Parkman, OH 44080. 216-548-3481.



☐ Make beautiful raised panels of professional quality. Two flute thick, high quality tungsten carbide tips, this bit makes raised panels for doors and great looking drawer fronts. One piece construction complete with ½" ball bearing pilot, and ¼" diameter shank. Bit #15. MLCS LTD, PO Box 53, Rydal PA 19046. MC/Visa. Call toll free 1-800-523-2445, Ext. 56 (In PA 1-800-346-7511, Ext. 56).

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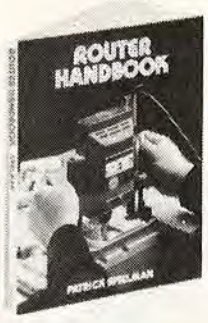

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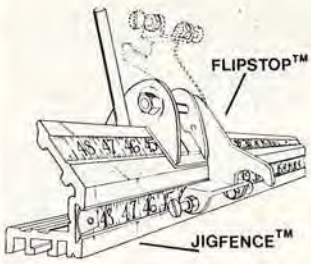

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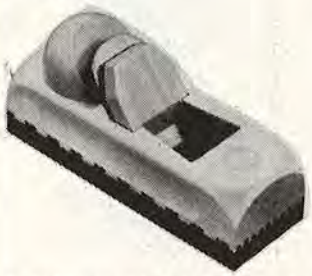

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WOOD

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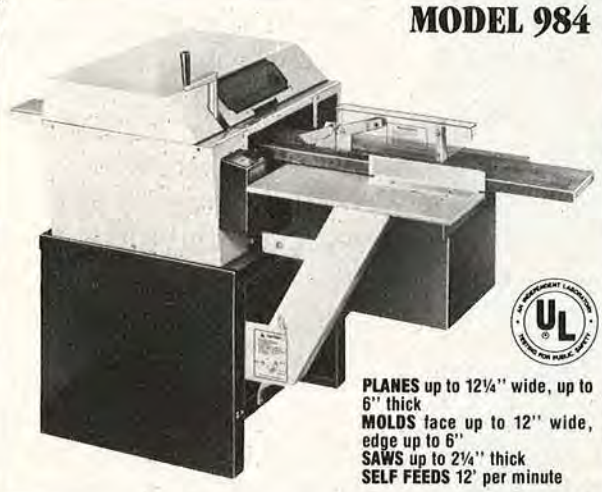

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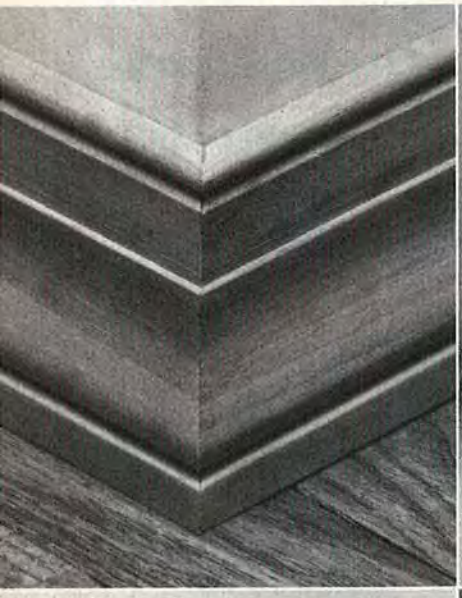

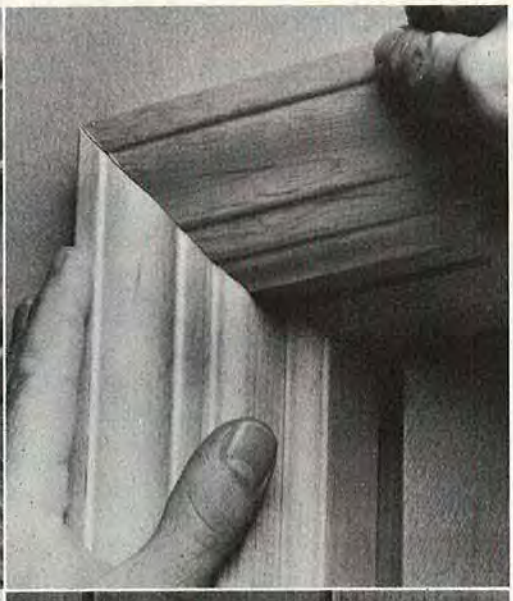

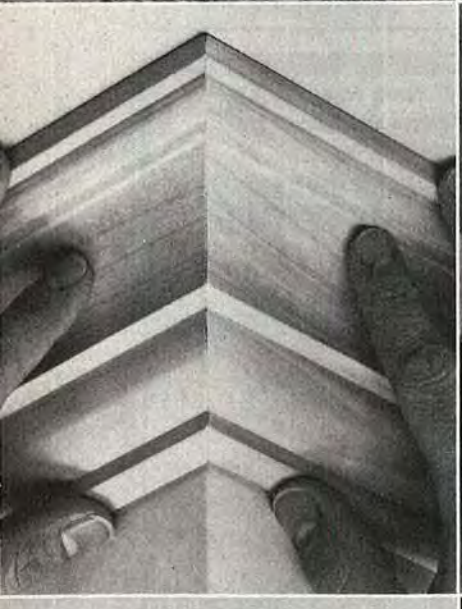

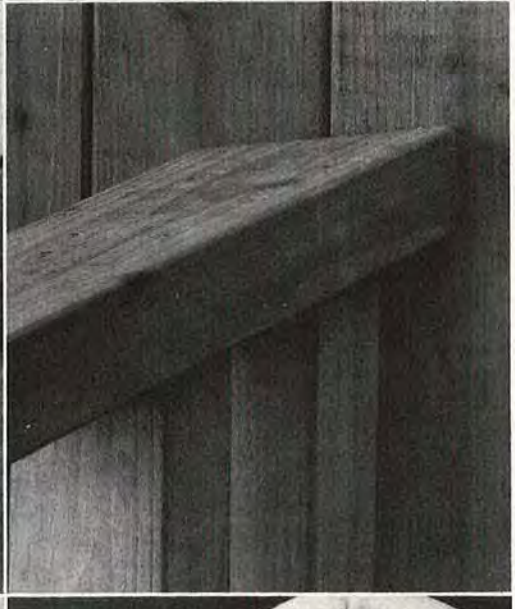

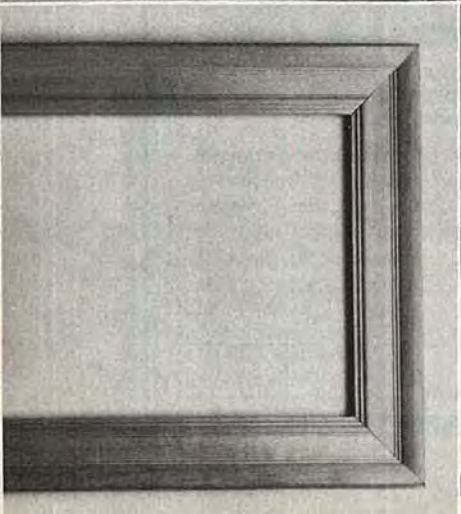

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MAHOGANY
the discovery of seafarers that made furniture makers famous

Paul L. McClure

Wood technologist; lecturer; owner of Wood World, a retail hardwood store in Tempe, Arizona. McClure also is a woodworking instructor and former exotic hardwood buyer.

straight stripe

mottle figure

crotch figure

plain-sliced

Tropical American (Honduras) mahogany

The classic choice of Hepplewhite and Sheraton, this distinctive rain forest hardwood first found its way to England via the Spanish Armada.

If Cortez hadn't needed to repair his ships while exploring the Caribbean in the 1550s, mahogany could have gone long unnoticed. But repair he did, and on his return to Spain, shipbuilders and sailors alike marveled at mahogany's lightness and strength, its fire-resistance, and its reluctance to splinter under a barrage of cannonballs. No wonder the larger ships of the Spanish Armada, which sailed against England in 1588, were built of this newly discovered wood.

Joiners and furniture makers loved the new wood because with it they could span greater widths and lengths than with walnut, and make more massive tables. In the 1700s, Hepplewhite, Chippendale, and Sheraton used mahogany extensively. Their popular furniture made mahogany prominent for the next 150 years.

Wood identification

Wood often travels under assumed names, so don't mistake the much less dense Philippine "mahogany" (or lauan) for the real thing. There are only three real mahogany species: Cuban mahogany *(Swietenia mahagoni)* from Cuba, Haiti, Jamaica, and the Dominican Republic (unavailable for political reasons); African mahogany *(Khaya ivorensis)*, from the Ivory Coast, Gold Coast, and Nigeria; and Tropical American mahogany *(Swietenia macrophylla)*, also known as Honduras mahogany, from Central and South America.

When cut, mahogany color ranges from salmon pink to light yellow, but all mahogany eventually ages to a rich, deep, reddish brown.

The wood has a semi-open grain with a density or weight that varies from 25 to 53 pounds per cubic foot, depending upon its origin (African mahogany tends to be lighter than Honduras mahogany, for instance). In lumber, only straight-grained stock with little if any figure normally is available. Veneers, however, include crotch, swirl, ribbon-striped, and mottled figures—mostly from African trees.

Working properties

Mahogany offers unexcelled working qualities with both hand and power tools. In fact, it's the standard by which other woods are measured. It won't warp, swell, or split. Strong for its weight, you can form mahogany into curved panels or delicate carvings. Easy to sand, it takes a high-gloss finish.

Uses in woodworking

Fine mahogany furniture for the home has declined in popularity, but the wood's qualities still make it ideal for elegant desks, tables, and large cabinets. Mahogany also finds its way into detailed carvings and splendid turnings.

Due to its lightness and moisture resistance, it's a popular wood for ships and boats, both as structural members and as decking and trim.

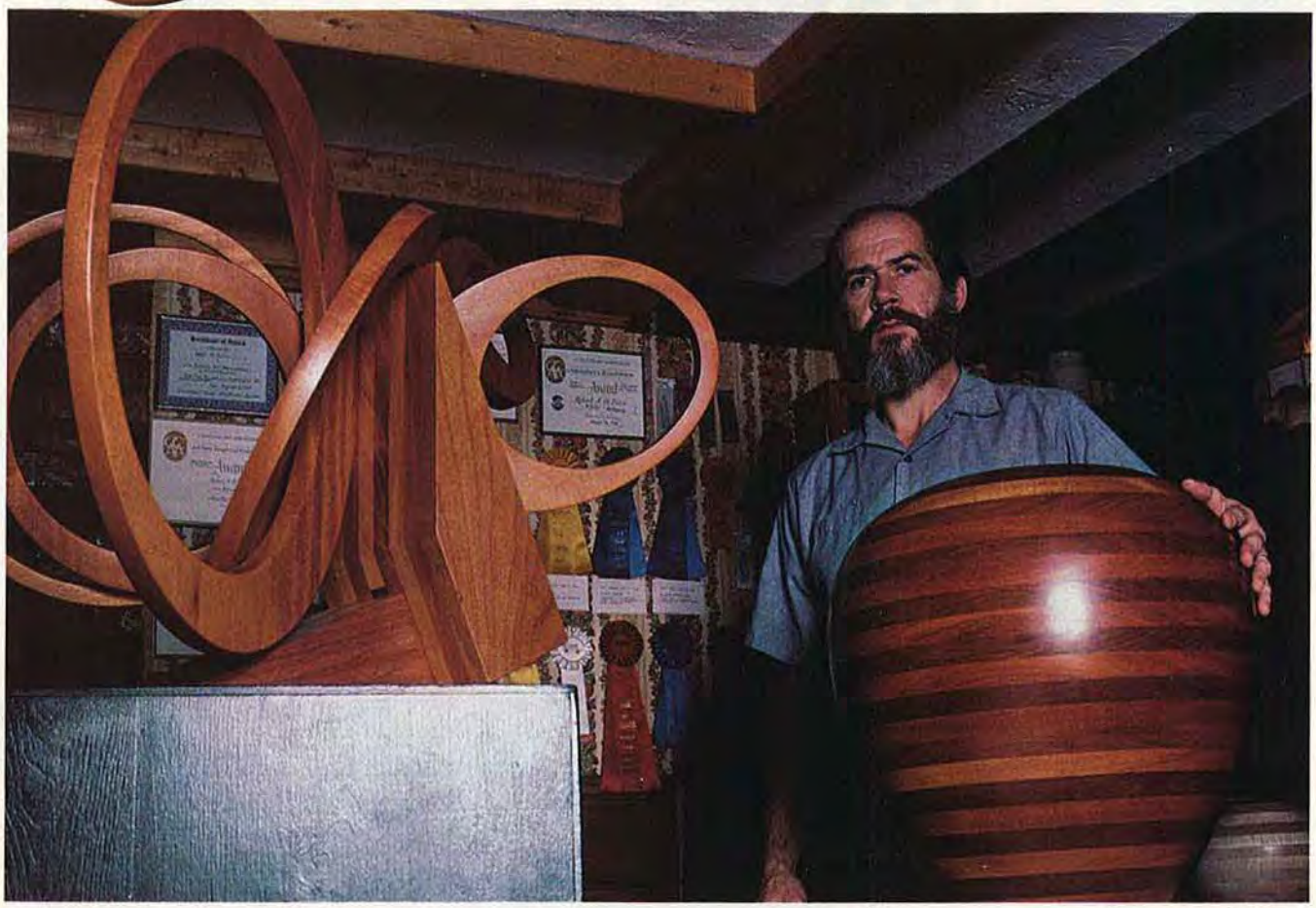
Cost and availability

On the West Coast, African mahogany, when available, is expensive. Elsewhere, it may approximate the cost of Tropical American (Honduras) mahogany, which runs about $1.50 per board foot more than red oak. Typically, mahogany boards run wider and longer than average, due to the large size of the tree.

Plain- and quarter-sliced veneers of both mahoganies are average-priced, while the highly figured crotch and swirls of the African species tend to be expensive. ■

Print this article

WORKING THE



Photographs: Jim Elder

Born in Massachusetts and raised in New Hampshire, Robert St. Pierre has spent his life working with wood. At age 5, he was nailing together birdhouses. At 14, he read blueprints and worked for a contractor. But it wasn't until years later, when a tragic freeway accident left him near death, that he discovered new opportunities for self-expression in wood. Bob, now 42, has found a new future. From his home basement workshop in Hanover, Massachusetts, he fashions pieces that earn him respect and acclaim. His wife, Mary, and son, Christopher, share his fascination with the rings of wood.

Woodworker, artist, and sculptor Robert St. Pierre creates award-winning vessels and art from laminated rings cut with a jigsaw.

Robert St. Pierre couldn't have imagined three years ago that his life today would be so entwined with wood. The exotic hardwoods he now works daily were then unknown to him.

Bob was a carpenter, a cabinetmaker, stuck at home while his bones mended from a major auto accident, when his future opened almost by chance. He had just completed remodeling the bathroom in his home—cabinets and countertops of oak, wainscoting, and wicker. To his wife, Mary, it was a wondrous transformation, but it needed a decorative piece to cap it off.

"Mary suggested a wooden vase," Bob recalls, "so I made one by cutting circles from scrap pine and plywood, gluing them up, then sanding and staining them. It was a crude cylinder, a canister, but she fell in love with it and said I should make more."

Bob did—enough to sell at local crafts fairs, where they were an immediate success. Encouraged, he experimented with designs using different configurations and woods.

"About a year and a half later, I

UNBROKEN RING

Buffed with wax, this set of mahogany vessels displays some of the variations possible with Bob's technique.

was feeling very satisfied with what I was doing, and the response was overwhelming," Bob recalls. "Now I'm trying to incorporate my work into art, which is what it is."

The "overwhelming response" includes first-place blue ribbons at local and regional arts and crafts shows, selections for prestigious gallery events and one-man shows. Recently, even corporations have shown interest in acquiring his large pieces. His vessels and sculptures of endless rings are indeed art to be looked at, touched, and savored.

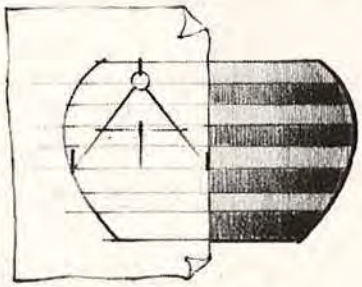
"The exciting part," Bob explains, "is when you go from one piece or project to another and you learn from each. You develop a feel for the wood, a knowledge of how it behaves. Each type of wood reacts and relates differently. Some exotic woods, for instance, are like working pieces of metal."

Creating designs and making patterns

Most people at first believe Bob's work was turned on a lathe. When he tells them each ring was individually cut, then all the pieces laminated together, they're dumbfounded. Yet the process is a simple one.

"Drawing a pattern is basic," he explains. "You can do it free hand, or trace from jar lids, containers, or utensils—I have half the kitchen in my workshop."

Follow Bob through the design of a vessel: First, he traces a half-section view onto graph paper, with one edge of the paper as the center line (i.e. what will be the middle of the vessel). Next, he draws horizontal lines representing the joint line between each wooden ring (see drawing, below). The spaces between lines are the exact thickness of the stock from which the finished rings will be cut. In effect, the drawing becomes a full-sized half-pattern—each line is the ring's radius and the outline indicates its angle. (Note that the pattern represents only half of the width of the stock from which the rings are sawn.)



Cutting the perfect ring

Bob now numbers each ring in consecutive order on the pattern, then measures the radius of each ring with a circle compass—stretching it from the center line (i.e., the edges of the paper) to the farthest outside point on the outline of the vessel for that ring. Next, he transfers the measurement to a board, scribing the full ring with a compass (step 1 photograph). The circle is then numbered to correspond with the pattern. After the outside circumferences of the circles are drawn on the boards, Bob decides the vessel's wall thickness. A very large piece, 12" high or higher, or 12" wide or wider, requires sides not less than ¾"-thick to give it strength and allow for sanding.

For ¾"-thick sides, Bob sets the compass ¾" in from the outer circle,

Step 1: From dimensions drawn on paper, Bob transcribes the cutting lines on stock with a compass.

then scribes the cutting line for the inside of the ring.

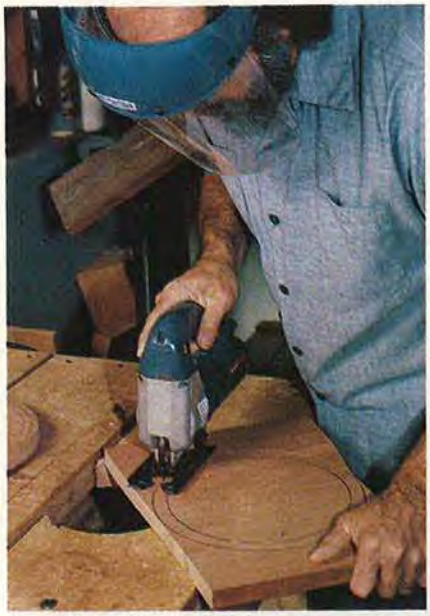
Next, he transfers the angle between top and bottom edge of each ring on the pattern to his jigsaw, then cuts the rings from the stock to that exact angle. Bob does this mostly by practiced eye, but suggests that beginners use a sliding bevel to measure the proper tilt for the jigsaw plate.

"I can't understand instant success. Just stay with it and success will happen."

Bob does all his cutting with the jigsaw at his workbench (step 2 photograph, next page). A special cutout in the bench top allows him to pivot the stock as he saws the circles. As each ring is cut, Bob crosses it off on the pattern so there's no confusion or duplication.

Bob doesn't like waste. He utilizes all his wood, often making rings for three different vessels from every circle of solid stock. This practice has reduced the cost of his hardwoods by two-thirds.

Continued



Step 2: Tilting the jigsaw's base to match the progressive angle of the vessel, Bob cuts continuous rings from mahogany stock.

The science of assembly

Putting all the pieces together looks simple. But according to Bob, how the pieces are laminated depends on the wood's density and thickness, and the size and the angle of the vessel.

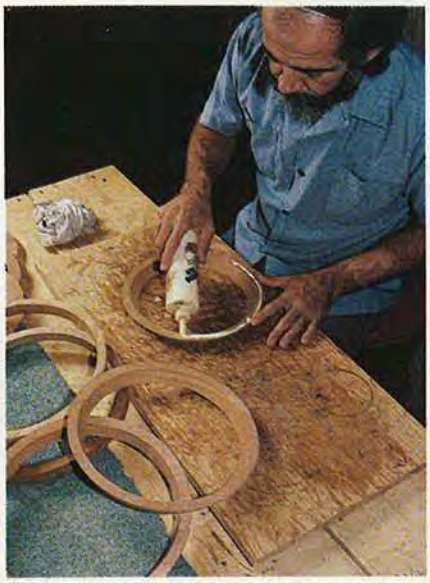
"You also have to consider what tools you have available for finishing," Bob advises. "If, for instance, you only have a short drum sander, you wouldn't want to glue up rings to a depth greater than that which you could easily sand."

Bob has learned from experience that no more than six rings should be glued together at a time; he usually laminates no less than four, depending on the structural integrity desired.

For gluing (step 3 photograph), Bob uses Franklin Tite Bond, a "yellow" adhesive that works for Bob in all situations, with all woods. White glue leaves a telltale line, and epoxies are too messy. (Bob sometimes has 25 or 30 rings atop the workbench). After making more than 600 laminated vessels, Bob has had only six crack at a seam—from glue-starved joints, he suspects.

Since sanding also takes care of any glue squeeze-out, Bob doesn't worry about removing it, particularly since Tite Bond won't gum up sandpaper.

"Woods are like individuals with characters of their own. Each reacts differently to laminating, sanding, finishing."



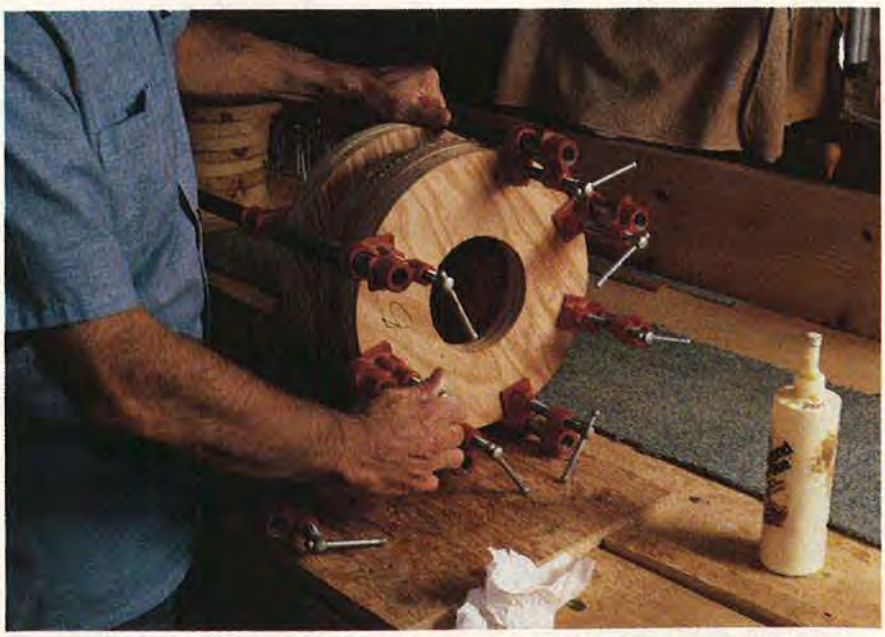
Step 3: Liberally applied glue isn't a problem. Bob will sand off the squeeze-out later.

Bob stacks the glued-up rings (step 4 photograph), adding two ¾" plywood "clampers", as he calls them, at both ends to distribute the force of the eight bar clamps, which he tightens alternately. The rings always remain clamped for 24 hours, a rule he won't break "no matter what the glue label says." A hole cut in the top clamper allows air circulation within the vessel to help the glue dry evenly.

Three-step sanding to round

The laminated rings can be sanded smooth with a rasp and orbital palm sander, as Bob did a few years ago, but today he uses timesaving equipment.

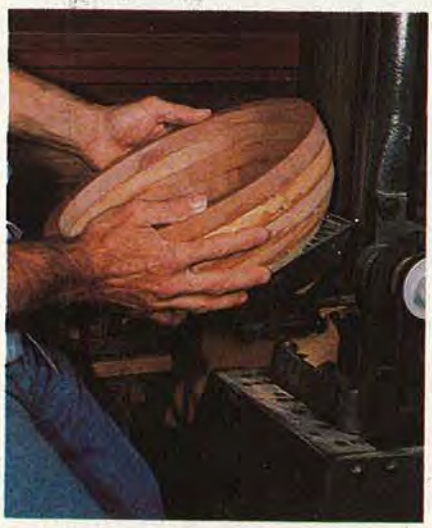
Bob speeds the sanding with a first round at his 6"×48" belt sander, mounted vertically (step 5 photograph). Glue and wood are easily ground away by lightly pressing the vessel to the turning, 36-grit belt. He sands the form from top to bottom, perpendicular to the rings. The vessel revolves in Bob's experienced hands as it touches the abrasive, going around and around until the ring joints have become smooth and even. Practice limits his time at the belt sander to only a minute or two. Bob's eyes and



Step 4: The 6" hole in the plywood clamp pads on top allows air to circulate while the glue dries.

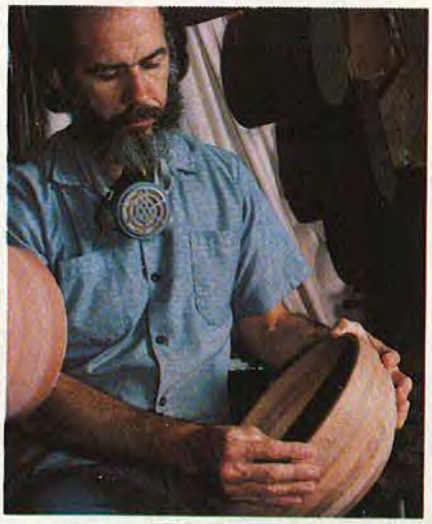
hands tell him when to quit. For others, it helps to draw a light pencil line in from the edge of the top ring as a sanding guide, he says.

Next, Bob moves down the line to the flap sander, where he'll work the inside of the vessel (step 6 photograph). Because the "flapper" tends to throw dust in all directions, it's fitted with a housing of a plastic bucket to which he's attached his shop vacuum hose. As he progresses through 6"-diameter wheels of 80 and 120 grit, the dust whirls away harmlessly through the collection system.



Step 5: Belt sanding, top to bottom and all around, removes glue and unevenness.

The 8"×10" balloon sander, with first 50-grit, then finer coatings down to 220, finishes the rings quickly (step 7 photograph). Then Bob turns the vessel in his hands looking for any slight imperfections he can correct later with his palm sander.

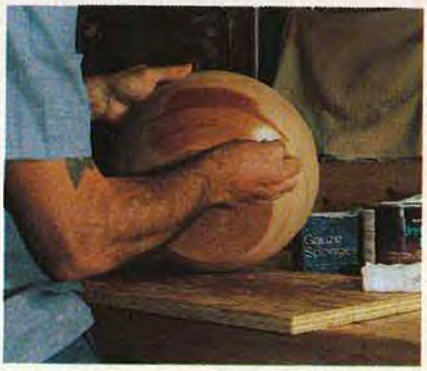


Step 7: Bob's 8"×10" balloon sander, at his right, fitted with abrasives down to 220 grit, does most of the finishing.

Applying a luster that lasts

For a finish, Bob prefers the permanence of four coats of oil-based urethane by Benjamin Moore, wiping them on with gauze pads (step 8 photograph). He uses penetrating oil only for such items as a salad bowl set, and then it's a nontoxic variety developed for the purpose.

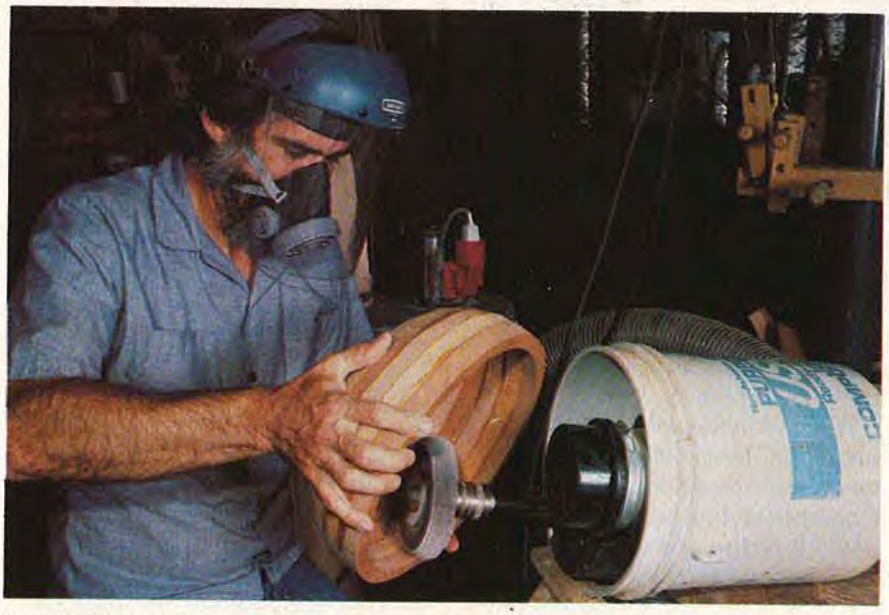
Bob sands after each coat of urethane with 280-grit paper, vacuuming the dust. After the fourth coat, he rubs the finish with #0000 steel wool. Finally, Bob applies a coat of Butcher's Wax Boston Polish for maximum protection. When he sets the piece aside, its finish is deep and lustrous, no matter the type of wood.



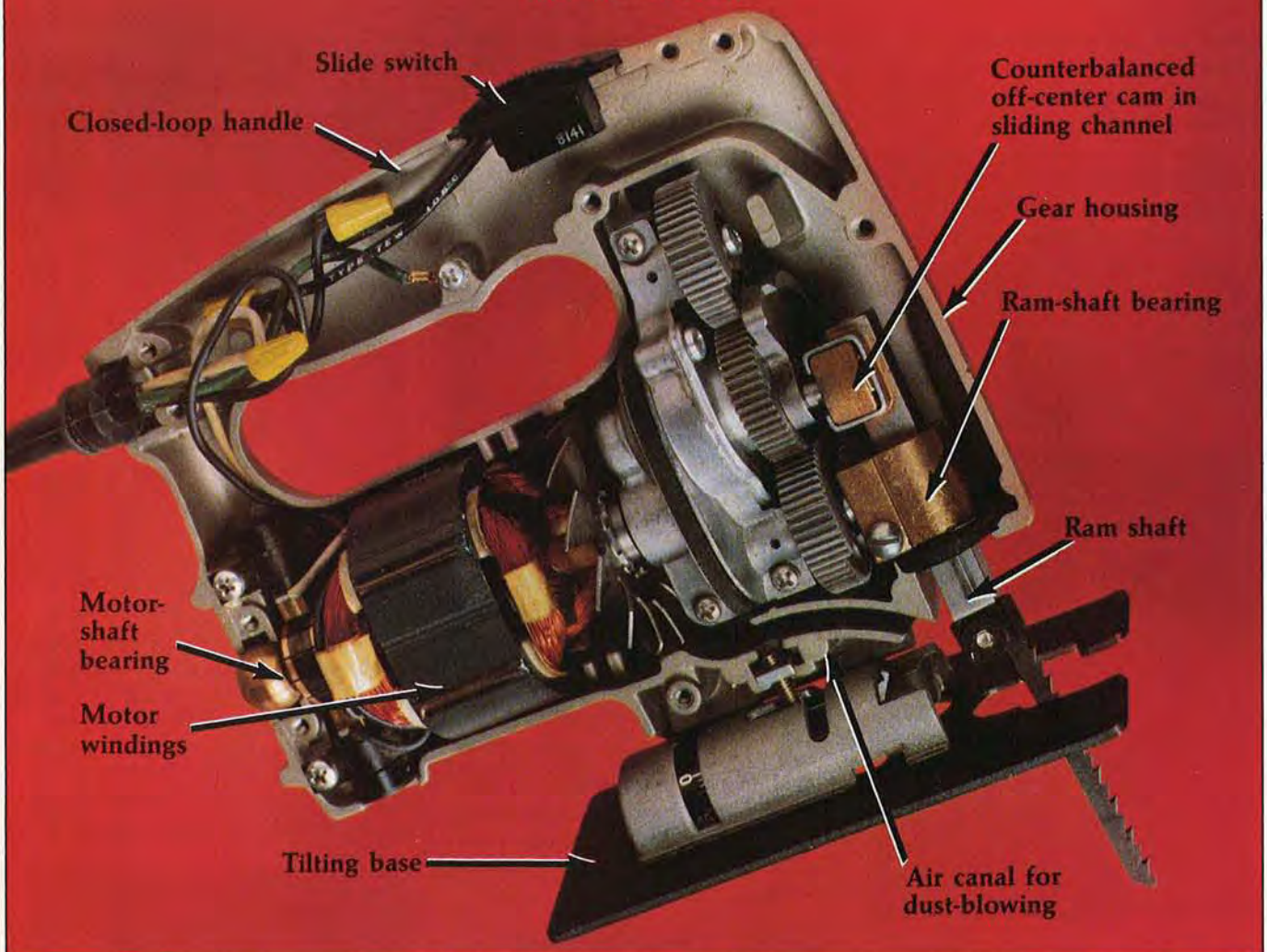
Step 8: Wipe-on urethane, then a coat of Butcher's Wax, gives the vessel luster and protection.

The mahogany that Bob prefers to use has a reddish glow. He's found it not only works and finishes well, but sells well, too. Poplar, his second favorite wood, looks totally uncommon. He likes it because of the often fascinating grain and varying color, which can give it the look of marble. "When I come across colored poplar, I hoard it like gold," Bob says. ■

"To me, wood is a living thing, and when you work it, you're enabling it to go on with new life from generation to generation. Maybe, somewhere down the line, someone will find a vessel of mine put away in an attic. They'll refinish it, give it new life, and a bit of my life will be renewed with it."



Step 6: Mounted in a plastic bucket with attached vacuum for dust collection, the flap sander works the rings inside the vessel.



THE JIGSAW

A STAR PERFORMER ANY WAY YOU CUT IT

Print this article

WOOD Tests 12 Jigsaws . . . See Page 36

Jigsaw Buymanship Chart . . . See Page 38

Whether you're a novice woodworker or an old pro around the shop, don't overlook the hardworking jigsaw. It's a Superman saw in a Clark Kent package.

There's no denying it: The jigsaw has acquired a bad reputation among some woodworkers (undeserved, in our opinion). We suspect it's the result of a lot of inferior saws given as presents *by* people who didn't know what to look for *to* people who didn't know how to use them.

Whatever the explanation, it's a bum rap. The jigsaw (or as some manufacturers call it, the saber saw) is one power tool you'll never outgrow. It can sub for a table saw, a bandsaw, or a scroll saw. Even after you've acquired the specialized cutting tools, it still pays for itself. The jigsaw is a multiuse tool that won't become obsolete because it does things that none of the other tools can. It will plunge-cut without having a pilot hole and cut patterns in pieces too large for a band saw or a scroll saw.

Versatility is the key asset of the jigsaw, especially if you take advantage of all the options available nowadays. It cuts just about everything, from foam to steel. And because it's so easy to maneuver, you can use the jigsaw in incredibly tight situations.

If you've been guilty of underestimating the jigsaw, we think that after reading this report you'll agree it's time to take a second look.

Gearing: the hidden difference

It's even more essential with the jigsaw than with other power tools that the gearing be well engineered. That's because the jigsaw must convert rotary (circular) motion to reciprocating (up and down) motion. This causes a lot of stress. The drive train, if not engineered properly, can loosen and the ram shaft can become unsteady. Unfortunately, there's no easy way you can judge the quality of internal parts, but do study the parts diagram packaged with the saw. Also, plug the saw in and run it free. Listen to the noise level and feel for vibration.

The blade roller guide

You'll find a roller guide mounted just behind the blade on most better jigsaws. The guide gives the blade extra support against the strong rearward pressure of cutting and side-to-side skewing. Auto scroll saws cannot have this feature because of the swinging action of the blade, but they have their own advantages. The saws that cut the best for us all had this feature.

Sure, a jigsaw without such a guide can hold the blade straight, but the harsh rearward pressure wears on the blade clamp and the lower sleeve bearing located on the arm shaft. This leads to repairs early-on.

The roller guide at the back of this Ryobi and other models relieves the stress on the ram shaft and keeps the blade running true.

The blade vise: small but critical

A poorly designed blade clamping system will cause you endless frustration—notably loose and broken blades. You want one that's strong and solid enough to absorb the resistance of cutting and the force of the motor. So check the blade vise and give it the "wiggle test" before you buy.

Because you'll be changing blades often with a jigsaw, the screw must be accessible and durable. Hex-key screws generally are least likely to let the tightening tool slip off and poke you. Slotted-screw versions tend to wear quickly. We suggest replacing slotted-screw types with a hex-key screw.

Controlling the cut: the electronic advantage

Speed control is another big plus offered by most jigsaws. Several variables combine to determine the optimum cutting speed for a given material—what you're cutting, how thick it is, how accurate you want to be, and whether you're cutting with or across the grain.

We found that jigsaws with the speed control separate from the on/off switch are easiest to control and less tiring to hold. This type of control is available only with saws that have electronic motor controls.

On some electronic models, the control microchip constantly monitors the motor and increases power to keep the blade speed constant. Having such control will help your jigsaw last longer for only a minimal added initial investment.

This Black & Decker model has a large electronic speed control dial mounted on the rear of the motor housing.

Some electronic saws like this Metabo have the speed control dial near the front for convenience while cutting.

Several jigsaws like this Black & Decker have variable-trigger switches. Note the dial used to set maximum speed.

Blades: universal is a plus

The blades you use can make or break the performance of your saw. The wrong blade for the cut, even if it's not of good quality, can turn a nice piece of lumber into kindling. You need to be able to obtain a variety of blades for your jigsaw since you'll be changing them often (jigsaw blades are replaced rather than sharpened).

Most jigsaws use blades that have a universal shank. Some, for a variety of reasons, take special blades (for instance, Bosch uses a highly rigid, top-locking, shouldered blade). But several of the saws that take special blades usually adapt to the universal blade.

Universal blades aren't necessarily the best, but they're lots easier to lay your hands on in a hurry than those with other configurations.

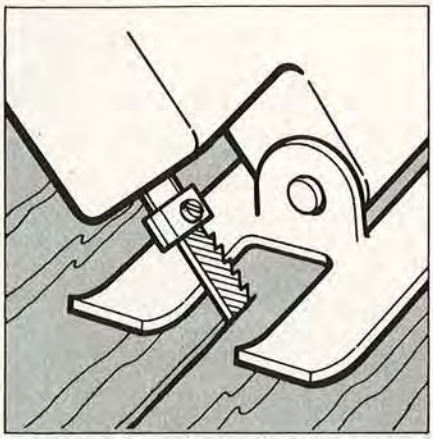
Continued

Scroll and auto scroll: the trade-off

Several high-end consumer saws (but not commercial saws) have the now-familiar scroll feature that lets you rotate the ramshaft 360 degrees. These saws also offer the relatively new auto scroll feature. With the blade positioned behind the ram shaft, you can change course simply by nudging the saw laterally along the cutting line—you don't even have to turn the blade-control knob as you would with the scroll feature.

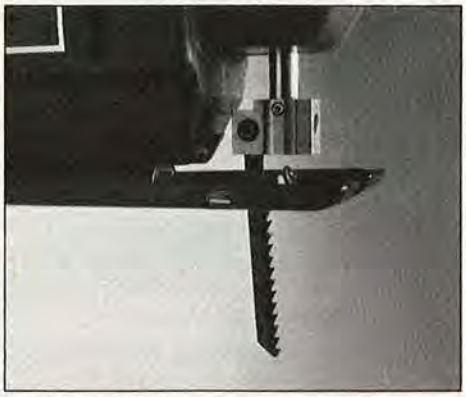
The advantages are clear—for instance, when you're making a cut inside a cabinet or a sink cutout next to a wall. It's especially handy when cutting reverse bevels: You simply set the bevel for one side, then—instead of changing the base—unlock the blade and turn it 180 degrees to cut backward.

Sounds great? It is, but there's a trade-off. Auto scroll increases flutter and vertical skew during precision cutting because scroll-type saws can't accommodate blade roller guides (discussed in another section of this article).



Reverse-bevel cutting

Saws like this Sears Craftsman model with auto scroll let you cut curves without changing the direction of the saw.



Auto scroll saws like this Black & Decker require that the blade be mounted behind the center line of the ram shaft. For *scroll* cutting, this model and several others have an extra lock to move the blade to the center line position.

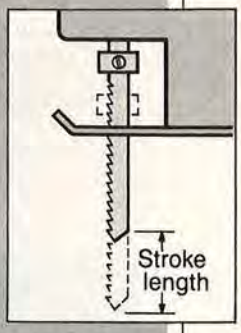
The slant on bevel cutting

Almost all jigsaws have tilting bases that let you cut left or right bevels up to 45 degrees. Unfortunately, the reliability of the bases and angle gauges, even in the best machines, varies considerably.

For example, we found the gauges to be universally inaccurate because of the way they operate. With a circular saw, the base is hinged at one edge and pivots at the other. A small degree of error remains small. But with the jigsaw, a much smaller base pivots on its axis to change the angle of cut. Therefore, a very small movement of the base is magnified into several degrees of bevel.

Sometimes, even tightening the clamp will cause a significant angle change that won't even register on the bevel scale built into the machine. Because of this, we stress that the only really safe way to set a jigsaw, including for a 90-degree cut, is with a protractor or a square.

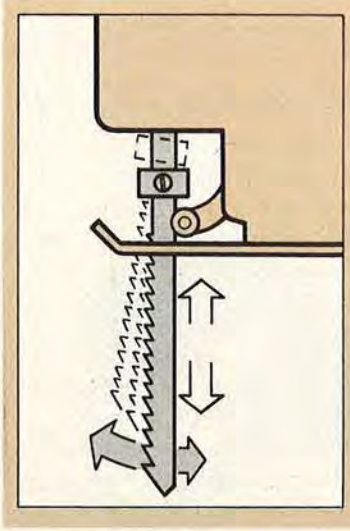
The cutting stroke: longer is better



With the jigsaw, stroke refers to the distance of the up-and-down movement of the blade (remember, jigsaws cut on the upstroke only). It's important to have enough stroke to do the job right.

Let's say you're cutting ½" plywood with a blade that has ten teeth per inch. The saw is running at 3,100 strokes per minute. With a ½" stroke, only ten teeth ever cut the wood, making 31,000 individual cuts every minute, and of all these cuts, only the center tooth actually cuts completely from top to bottom. The farther away each tooth is located from the center tooth, the less wood the tooth cuts with each stroke.

With a 1" stroke, 20 teeth touch the board and make 62,000 cuts. Since more of the blade comes out of the wood with the 1" stroke, the sawdust is cleared much more efficiently and the saw actually cuts faster. With the longer stroke using more teeth to make the cut, the blade stays sharper and lasts longer.



Orbital action: well worth it

"It's like the difference between cutting down a tree with a handsaw versus with a chain saw," says our friend, and we agree. Orbital action is a definite plus when speed is the priority.

In the straight-action mode, the blade moves up and down only. Fewer teeth clear the lumber as you cut because sawdust tends to accumulate in the gullets of the teeth. This slows the stroke and heats up the blade.

With orbital action—available at a single setting on some saws and at several on others—the blade backs off the cut many times each second. This lets the troublesome sawdust fall away from the cut. Plus, the "hammering" effect of orbital action speeds cutting, and having the blade back off as it makes its "orbit" means the saw is much less likely to jump out of a thick board.

However, there is one drawback to orbital action: chipping. Most orbital jigsaws try to avoid the problem by including an anti-chipping insert that slips onto the saw base and fits snugly to the blade sides. But chipping still can occur when you want to make a fine cut.

Getting a handle on your jigsaw

If you're like most woodworkers, the feel of the saw in your hand is all-important. Weight and size count big. So do controls that are easy to operate and a handle that fits your grip.

Before you buy a saw, turn it on, even without a blade. Let it run free in your hand for a moment. The better the saw, the less vibration. In the best jigsaws, vibration is negligible—a big advantage when you do a lot of scrolling.

Most jigsaws have the standard closed-loop handle, but we found what we think is a better alternative on some top-quality models: the barrel grip. It offers more control and is less fatiguing, although these jigsaws look as if the manufacturer forgot to attach the conventional handle. You just grab onto the motor housing.

With your grip much closer to the work surface and the center of the blade, the stresses of pushing and turning are minimized, and swinging the saw back and forth while doing tight work is much easier.

The barrel and knob grip on this Hitachi jigsaw allows excellent control.

Shop around—it pays to check out discounts

The jigsaws we included in our chart on page 38 ranged in price from only $17.99 all the way to $279.00. Obviously there's quite a spread between consumer saws (i.e., light-duty saws designed primarily for home craftsmen) and top-of-the-line commercial models (heavy duty, good enough for building tradesmen). But don't rule out any saw on the basis of price alone. As you can see in looking at tool advertisements, discounts are available on power tools all over the country. You'll find some top-flight commercial saws that list for $200 or more can cost you just $140 or even less. Discounts aren't as generous for the high-end consumer models, but you can get one for as little as $60.

Parting pointers: what to check before you buy

- Is the switch easy to use and to lock on?
- Is the cord durable and flexible, and long enough for your needs?
- Is there a dust blower?
- Will you need more than one adjusting tool for the blade and the bevel base?
- Is there a handy way to store the adjustment tool?
- If there is a blade guard, will it hinder vision?
- Is the saw noisy or quiet-running?
- Did the manufacturer include an easy-to-read plate or decal that tells what speed to use with different materials? ■

This AEG clearly tells you what speed and orbital setting to use.

The wire chip guard on this Metabo won't cloud like some plastic.

The wrench holder on this Makita is one of the most convenient.

WOOD tests jigsaws—A dozen of 'em

(See chart for further specifications about each of the saws tested.)

About our test procedure

• We contacted jigsaw manufacturers and told them we wanted to evaluate saws designed for serious woodworkers who need to make furniture-quality cuts. The manufacturers then selected the saw(s) they wanted to represent their line.

• We tested all saws on the same pattern (see photo), making ¾"-radius turns in ¾" red oak stock.

• We used the same Milwaukee

blade (six teeth per inch) in all saws, except for Bosch, Makita, and Porter-Cable models, which would not accommodate a universal blade. We chose the Milwaukee as our universal blade because it was most suited to cutting the small-radius curves of our pattern. We also chose the bimetal Milwaukee blade for its durability.

• The scrollwork in our pattern required that all the jigsaws be set in the straight-action position. However, we did try all saws on other pieces of lumber using various orbital action positions when possible.

• When testing auto scroll saws, we cut the first half of the pattern with the blade locked and the last half with the blade in the auto scroll mode.

AEG model BSPE60. *West Germany. Orbital. Locking on/off trigger with electronic speed control dial. Hex wrench for locking blade and bevel base stored in saw base. $198.00.*

This saw runs smooth as silk. It's lightweight, yet has little vibration. The saw stays steady on the work, even in tight corners. There is some blade play in the corners, but nothing we consider serious. The 13' cord is by far the longest of any we tested. The speed control on the top of the handle is convenient, and we found that the large, trigger-type on/off switch is comfortable to use.

Black & Decker commercial model 3157-10. *U.S.A. Orbital. Conventional variable-speed trigger switch. Two Allen wrenches furnished—one for the blade and a larger one for the bevel base. $174.00.*

This saw gave one of the best cuts in the test. It fits the hand well, too. We did note that it cut better with our control blade rather than with the blade provided. The sides of cuts are very straight, with only minor blade skew in tight corners. Two drawbacks we noted, though, are noise and the variable-speed switch, which was difficult to hold in the "on" position and to maintain at a constant speed (we noticed the same difficulty when testing the Milwaukee and Makita saws).

Black & Decker consumer model 7566. *U.S.A. Auto scroll. Nonorbital. On/off locking trigger. Electronic speed control. Blade and bevel locks use a flat-blade screwdriver. $117.99.*

Of the three auto scroll saws in our test, this one does the best overall. It's also the only consumer-class electronic jigsaw we tested. The cut is generally straight with only slight skew. However, there is some noise, vibration, and chatter. Speed remains constant thanks to the speed control being separate from the on/off switch. On the other hand, having the speed-control dial on the back can be a drawback. It's not as convenient as having the thumb control located on the handle. The unusually large size of this jigsaw can make it awkward to use and control in some cutting situations.

Bosch model 1581. *West Germany. Orbital. Electronic. On/off locking switch with dial speed control. Blade-lock screwdriver furnished. Hex-key base lock stores in base. $195.00.*

This saw gave the straightest vertical cut in the test. It runs very smoothly and quickly, although there is some hop while cutting. The blade is easily visible. A handy feature is the adjustable dust blower. A special blade-locking device precludes using the universal blade, but there are several shoulder-style blades available. The blade-locking mechanism clamped tighter than any other in the test. However, at 6'6", the cord is one of the shortest.

Hitachi model CJ65VA. *Japan. Barrel/knob grip. Orbital. Electronic. Slide-locking switch. Speed control in rear. Hex key for both blade and bevel base stores on cord. $192.00.*

This jigsaw spoils you fast. Control with the special grip is superior (this style really seems to be catching on). The hand is much lower and closer to the blade, which makes applying forward pressure much less tiring. The blade is directly below the center of your grip, so instead of swinging your whole arm to make tight scrolls, you twist your wrist. Like the other dial-type speed controls, the speed stays where set and the motor runs very evenly. The sliding switch locks securely and the orbital action works well, too.

Makita model 4300BV. *Japan. Conventional variable-speed trigger control with lock. Nonorbital. Hex key for both blade lock and bevel base. Hex-key holder on cord. $192.00.*

This is a well-assembled machine that cut the test pattern easily with only a slight blade skew on tight corners. The blade is highly visible. However, the speed control trigger switch on this and similar saws is not as handy as the electronic speed control systems. The blade-holding mechanism is designed specifically for Makita blades, but an adapter mounts with a drive pin to the end of the ram shaft to accommodate universal blades. Still, we found it best to use the Makita blades provided—the universal blade can move back and forth in the special holder. Overall, this saw is easy to handle and it negotiates turns and twists nicely.

Metabo model EP455. *West Germany. Orbital. Electronic. On/off switch with top-mounted speed control dial. One Allen wrench furnished to lock blade and bevel base. Wrench stored in molded sockets on the cord-strain relief. $149.00.*

This jigsaw runs smoothly from the slowest to the fastest speeds. The on/off switch is comfortable, and the thumb position of the speed-control roller works well. The saw is easy to control, with only slight chatter in tight curves and some minor skewing. You don't lose power at slower speeds, and the orbital action cuts hard maple like a hot knife through butter. The special wire blade guard swings out of the way when you change the blade. This type of guard doesn't become clouded by dust, but since it's solid it can obscure vision from some angles.

Milwaukee model 6255. *U.S.A. Conventional variable-speed trigger switch. Nonorbital. Both the blade and bevel base lock in position with a flat-blade screwdriver. $169.00.*

This rugged saw is one of the best for cut, feel, and performance. It fits the hand better than most

Continued

JIGSAW COMPARISON/SPECIFICATION CHART

Manufacturer	Model	Amps	Weight (lbs.)	Bearings	Orbital (Y, N)	Auto Scroll (Y, N)	Strokes per min.	Stroke length	Blade lock	Base lock	Handle type	Motor Controls			Roller guide	Blade type	Suggested Retail
												Electronic or Conventional	Switch Type	Speed Control			
AEG	STPE60	5.5	5¾	Ball	Y	N	300-3100	1⅛	HK	HK	CL	E	T	Dial	Y	U	239.00
AEG	FSP60	4.6	4½	Ball	Y	N	3200	1	HK	HK	B	C	S	Single	Y	U	158.00
AEG	FSPE60	4.6	4½	Ball	Y	N	300-3200	1	HK	HK	B	E	S	Dial	Y	U	178.00
AEG*	BSPE60	4.6	4½	Ball	Y	N	300-3200	1	HK	HK	CL	E	T	Dial	Y	U	198.00
Black & Decker Consumer*	7566	5	5¾	Ball roller sleeve	N	Y	1300-2800	1	FB	FB	CL	E	T	Dial	N	U	117.99
Black & Decker Consumer	7578	3	4¼	Sleeve	N	Y	0-3200	⅝	FB	FB	CL	E	S	Vari-slide	N	U	48.99
Black & Decker Consumer	7571	3	4¼	Sleeve	N	Y	2500L 3200H	⅝	FB	FB	CL	C	S	2-speed	N	U	49.99
Black & Decker Consumer	7580	3	3½	Sleeve	N	N	0-3200	⅝	FB	FB	OG	C	S	Vari-slide	N	U	29.99
Black & Decker Consumer	7530	3	3⅜	Sleeve	N	N	2500L 3200H	⅝	FB	FB	OG	C	S	2-speed	N	U	26.99
Black & Decker Consumer	7504	2.1	3¼	Sleeve	N	N	3200	⅝	FB	FB	OG	C	S	Single	N	U	17.99
Black & Decker Commercial	3153-10	4.5	6¼	Ball roller	N	N	0-3100	1	HK	HK	CL	C	T	Vari-trig	Y	U	158.00
Black & Decker Commercial*	3157-10	4.5	6¼	Ball roller	Y	N	0-3100	1	HK	HK	CL	C	T	Vari-trig	Y	U	174.00
Black & Decker Commercial	3159-10	4.5	6¼	Ball roller	Y	N	2100 & 3100	1	HK	HK	B/K	C	P	2-speed	Y	U	178.00
Bosch	3238VS 3230	3.15	4½	Ball	Y N	N	0-3000 3000	¾	HK	HK	CL	C	T	Vari-trig Single	Y	S	119.00 79.00
Bosch	1582 1582VS	4.8	5½	Ball	Y	N	3100 500-3100	1	FB	HK	B/K	E	S	Single Dial	Y	S	179.00 209.00
Bosch*	1581 1581VS	4.8	5¾	Ball	Y	N	3100 500-3100	1	FB	HK	CL	E	T	Single Dial	Y	S	195.00 225.00
Hitachi	JH-60A JHV-60	3.5	5¼	Ball	N	N	3200 0-3200	1	HK	HK	CL	C	T	Single Vari-trig	Y	U	170.00 208.00
Hitachi*	CJ65 CJ65VA	3.7	5¾	Ball	Y	N	3200 700-3200	1	HK	HK	B/K	C E	S	Single Dial	Y	U	176.00 192.00
Makita	JG1600	2.6	3¾	Ball	N	N	3700	⅝	HK	HK	B/K	C	P	Single	Y	M or U	138.00
Makita*	4300BV	3.5	5½	Ball	N	N	0-3100	1	HK	HK	CL	C	T	Vari-trig	Y	M or U	192.00
Makita	4301BV	3.5	6	Ball	Y	N	0-3100	1	HK	HK	CL	E	T	Vari-trig	Y	M or U	208.00
Metabo	451/2 E452	4	3¾	Ball roller	N	N	2200 & 3000 500-3000	¾	HK	HK	CL	C E	T	2-speed Dial	Y	U	99.00 129.00
Metabo*	EP455	4	5	Ball roller	Y	N	500-3000	¾	HK	HK	CL	E	T	Dial	Y	U	149.00
Metabo	E562 P563 EP569	5	5¼	Ball	Y Y	N N	3000 500-3000 500-3000	1	HK	HK	B/K	E	S	Single Dial Dial	Y Y	U U	199.50 209.50 239.00
Milwaukee	6245	3.8	5¾	Ball roller	N	N	3100	1	FB	Non adj	B	C	P	Single	Y	U	190.00

Manufacturer	Model	Amps	Weight (lbs.)	Bearings	Orbital (Y, N)	Auto Scroll (Y, N)	Strokes per min.	Stroke length	Blade lock	Base lock	Handle type	Motor Controls: Electronic or Conventional	Motor Controls: Switch Type	Motor Controls: Speed Control	Roller guide	Blade type	Suggested Retail
Milwaukee*	6255	3.8	7	Ball roller	N	N	0–3100	1	FB	FB	CL	C	T	Vari-trig	Y	U	169.00
Milwaukee	6282	2.3	8	Ball roller	N	N	0–3900	1	FB	Tilting head	CL	C	T	Vari-trig	N	U	279.00
Porter-Cable*	348	3	5	Ball sleeve	Y	N	3500	9/16	FB	FB	CL	C	S	Single	N	PC	143.00
Porter-Cable	548	3.5	6	Ball needle	Y	N	0–4500	7/16	HK	Non-adj	CL	C	T	Vari-trig	N	PC	235.00
Ryobi*	JS-60 JSE-60	3.5	5½	Ball	Y	N	3000 1000–2700	1	PB	PB	CL	C E	T	Single Dial	Y	U	160.00 186.00
Sears Consumer	1718	2.1	4⅝	Sleeve	N	N	2600 & 3000	½	FB	FB	CL	C	S	2-speed	N	U	19.99
Sears Consumer	17215	2.2	4¾	Sleeve	N	N	0–3000	½	FB	FB	CL	C	S	Vari-slide	N	U	39.99
Sears Consumer	1070	2.5	5½	Sleeve	N	N	0–3000	⅝	FB	FB	OG	C	T	Vari-trig	N	U	49.99
Sears Consumer	1072	2.5	5¾	Sleeve	N	Y	0–3000	⅝	FB	FB	OG	C	T	Vari-trig	N	U	59.99
Sears Consumer*	17205	2.8	6⅓	Ball sleeve	N	Y	0–3000	¾	FB	FB	OG	C	T	Vari-trig	N	U	79.99
Sears Consumer	1840	3.7	7½	Ball roller sleeve	N	Y	0–3000	1	FB	FB	CL	E	T	Dial	N	U	99.99
Sears Commercial	2724 2725	4.5	6¾	Ball roller	Y	N	2100 & 3100 0–3100	1	HK	HK	B/K CL	C	P T	2-speed Vari-trig	Y	U	139.99 149.99
Skil Consumer	4115	3	3⅝	Sleeve	N	N	2600 & 3200	⅝	HK	HK	CL	C	T	2-speed trigger	N	U	38.99
Skil Consumer	4235	3	3⅝	Sleeve	N	N	0–3200	⅝	HK	HK	CL	C	T	Vari-trig	N	U	39.99
Skil Consumer	4355	3	3⅞	Sleeve	N	Y	0–3200		HK	FB	CL	C	T	Vari-trig	N	U	42.99
Skil Consumer	4395	3.2	4	Sleeve	Y	Y	0–3200	⅝	HK	HK	CL	C	T	Vari-trig	N	U	54.99
Skil Commercial	492	3.5	5⅔	Ball sleeve	N	N	0–3200	13/16	FB	FB	CL	C	T	Vari-trig	N	U	80.00
Skil Commercial*	500	3.5	5⅔	Ball roller	N	Y	0–3200	13/16	FB	FB	CL	C	T	Vari-trig	N	U	90.00
Skil Commercial	515	3.5	5¾	Ball roller	Y	N	0–3200	13/16	FB	FB	CL	C	T	Vari-trig	N	U	79.99

Blade type: U = Universal S = Shoulder M = Makita P-C = Porter-Cable

Blade lock and base lock: HK = Hex key, FB = Flat blade screw, PS = Phillips screw

Handle: CL = Closed loop, B = Barrel grip, B/K = Barrel/knob grip, OG = Open grip

Switch: T = Trigger, P = Paddle, S = Slide

*One of the jigsaws *WOOD* tested. See article for results.

saws in the test. Balance is excellent. The side cuts are straight with insignificant skew, even in tight corners. The blade is readily visible from all angles. However, the variable-speed switch is a drawback and another concern is that you can't lock the trigger "on" without using a nail or pencil to depress the locking pin. Also, the saw is non-orbital. Despite these annoyances, the fine cut of this saw makes the pluses outweight the drawbacks we encountered.

Porter-Cable model 348

U.S.A. Conventional single speed. Constant small orbit. Bayonet-style blade. Both blade and base lock with flat-blade screwdriver. $143.00.

This saw is well built, with all-metal construction. (You can see the saw's internal parts in the lead photo of the buymanship article on page 32.) Overall, it's smooth running and quiet. The jigsaw's unique bayonet blade limits you to Porter-

Continued on page 73

Handcraft this heirloom-quality woodworker's LEVEL

Genuine mahogany has long been recognized for its stability; ebony for its hardness and strength. This easy-to-make tool capitalizes on the merits of both woods. What you get is a layout tool that will meet the test of time, for a fraction of the cost of a commercially available model of the same high quality.

Note: Adjust your saw for accuracy before you make a precision tool like this one. For help with how to tune up your table saw, see *WOOD*, Nov./Dec. 1984, page 8.

You'll need some ⅛" ebony and ½" mahogany for this project. Either resaw or plane thicker stock to size, or special-order the material. (We specified the sizes needed and ordered ours from Craftsman Wood Service, 1735 W. Cortland Ct., Addison, IL 60101; catalog $1.)

Design: George Granseth
Photograph: Bob Calmer
Illustrations: Bill Zaun

Assembling the level

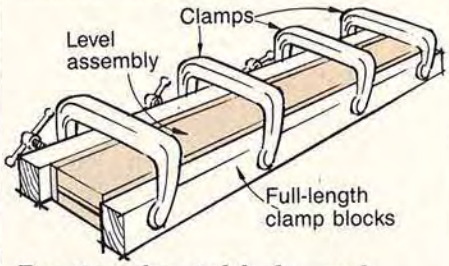
1 Rip the mahogany strips (A) and ebony strip (B) to 2¼", then crosscut all three to 24½". Rip two ebony pieces (C) to 1¼" and crosscut them to 24½".

2 Using epoxy, glue and clamp A and B together sandwich-fashion, with the ebony between the mahogany (make sure all edges are flush). After the epoxy has dried, scrape off the excess.

3 Carefully joint one edge of the sandwich so it rests evenly on a perfectly flat surface. With the flat edge against the rip fence on your table saw, rip the assembly to 2⅛" then joint 1/16" off the cut edge. (This procedure ensures that both edges are straight and parallel.)

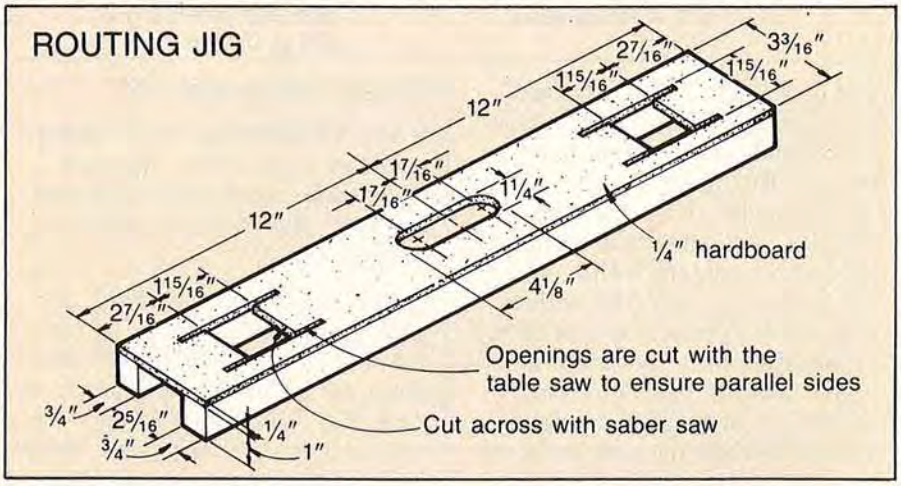
4 Using clamp blocks as shown in the drawing below, glue and clamp the ebony strips (C) to the assembly. Then, after the epoxy dries remove the excess and hand-plane the overlapping edges of the ebony flush with the mahogany.

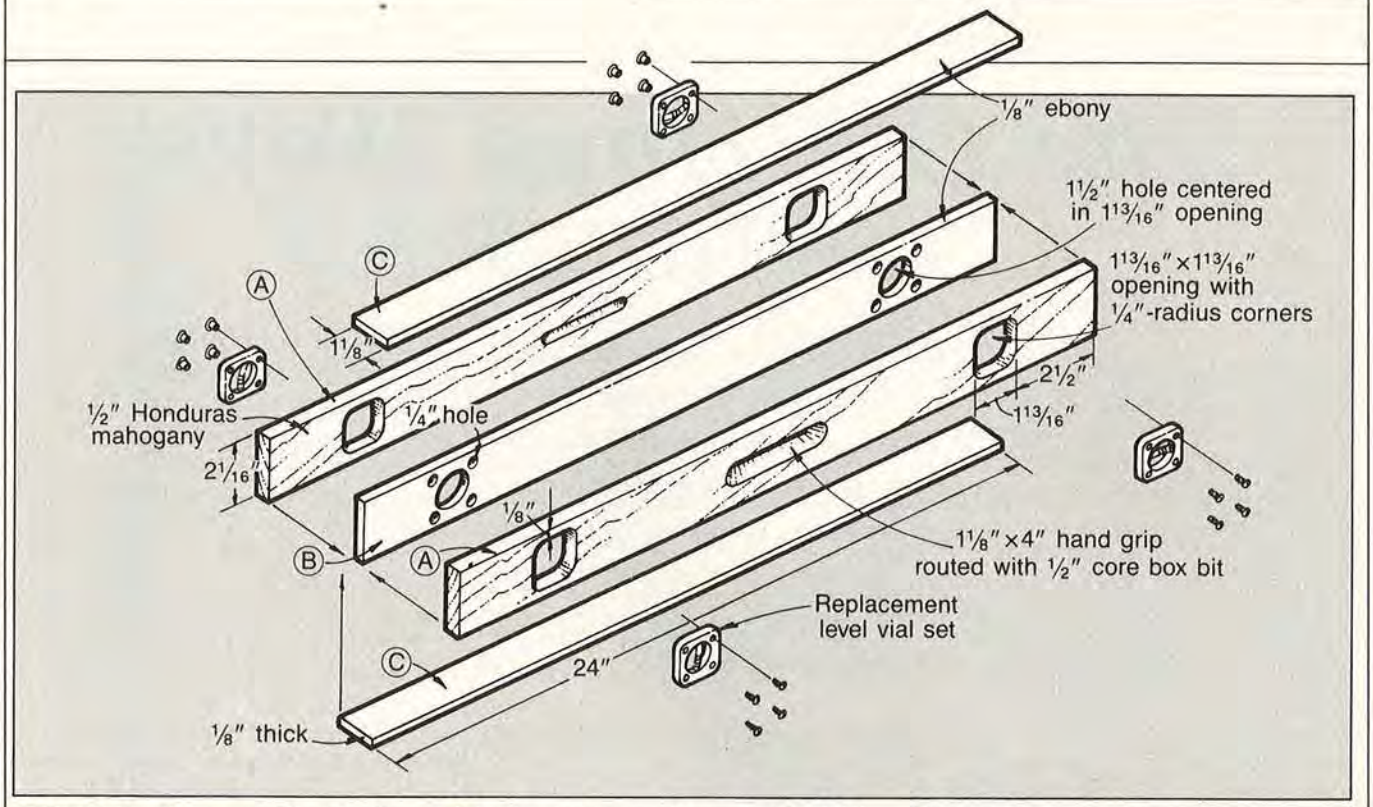
5 Crosscut the level assembly to its finished length (24").



Routing the vial holes and hand grip

Note: Fashioning the vial holes and the hand-grip recesses requires careful routing. To ensure precision and avoid costly mistakes, we built the routing jig shown below.

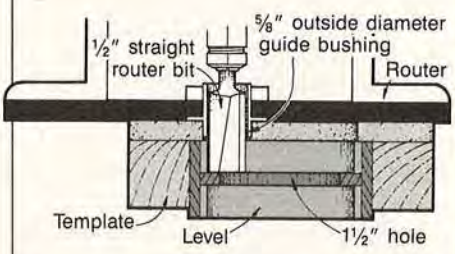




1 Build the jig as specified in the drawing. Mark one end of the level and one end of the jig and keep these marked ends flush when marking and routing for perfect alignment.

2 Place the level in the jig and trace the outline of the square vial holes. Draw diagonal lines from corner to corner to find the squares' centers, then drill a 1½" hole through the level at each center point. (Because the holes must be perpendicular to the body of the level, we recommend that you use a drill press for this step and that you back the level with scrap to prevent chip-out.)

3 Carefully realign the level in the jig and clamp both the jig and the level firmly to a work surface. Using a ½" straight bit and guide bushing, set the depth of cut so the bit cuts through the mahogany and just flush with the ebony. Rout out both squares as shown in the Vial Routing Drawing. Place the jig on the opposite side of the level and rout the squares on the other side (align carefully so the square recesses are directly across from each other).



4 Switch to a ½" core-box bit and set the router's depth of cut to the same depth as in the previous step. Rout the handle slots on both sides of the level. (Because a core-box bit won't cut a flat bottom, we used a chisel to clean out the bottom of the slots and then sanded them smooth.)

5 Carefully smooth all surfaces of the level with a cabinet scraper. Next, hand-sand the entire level, taking care not to round-over any of the edges.

6 Remove any sanding dust. (We fired up our air compressor to blow out the fine ebony dust from the mahogany grain.) Apply sanding sealer and several coats of finish, rubbing with steel wool between coats. Once the finish is dry, apply a couple coats of paste wax for further protection.

Installing the vials

1 Place another level on a flat surface and shim under it until it reads perfectly level. Place your nearly completed level on top of the reference level and insert a vial set in one end. Adjust the vials until the bottom bubble reads level. Carefully mark the centers of the four holes in the corners of the vial set.

2 Remove the vials and drill ¼" holes through the four marked points. Reinsert the vial set and tighten the screws finger-tight. Put your new level back on the reference level and adjust the bubble so that it reads level, then tighten the screws.

3 To install the plumb vials, repeat steps 1 and 2. (We clamped the reference level in a vise and used it as an adjustment guide.) ■

Bill of Materials

Part	Finished Size*			Material	Qty.
	T	W	L		
A*	½"	2 1/16"	24"	Honduras mahogany	2
B*	⅛"	2 1/16"	24"	ebony	1
C*	⅛"	1⅛"	24"	ebony	2

*Parts are cut larger initially, then trimmed to finished size. Read instructions before cutting.

Supplies: epoxy, sanding sealer, paste wax, Macklanburg-Duncan replacement vials for #600 series level (complete with mounting screws) Part #0319-3000

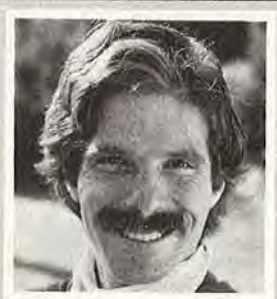
Print this article

The Old Hand Ways
THE TURNER

If you had been a wealthy prince in czarist Russia, and could have passed your time in any way you wanted, would you have chosen to spend it turning wood on a foot-treadle lathe?

Perhaps not, but if you've done any wood turning at all, I'm sure you agree that it's the most entrancing of all mechanical processes. The perfection of spinning symmetry revealed by the chisel holds a timeless fascination for us all.

What's good for a prince is good for a pauper. I built my first lathe, a foot-powered, flywheel-driven delight, so that I could start making (and, I hoped, selling) spinning wheels. I've used it for many years now to make everything from tiny toy whistles to chairs, and burl bowls to patterns for casting brass gears and iron flywheels. Aside from the fact that it uses foot power, my lathe is as capable of complex or precision work as any modern lathe. In fact, based on its early 16th-century design, it's a pretty advanced model. By comparison, though, the basic Etruscan model of 1000 B.C. is hard to beat.



By Roy Underhill

Master housewright at Colonial Williamsburg, host of the highly successful P.B.S. series "The Woodwright's Shop," author, lecturer, and master craftsman.

"Through the door came the regular hum of a lathe. The princess timidly opened the door which moved noiselessly and easily. She paused at the entrance. The prince was working at the lathe and after glancing round continued his work."

Tolstoy
War and Peace

The foot-operated spring-pole lathe, a European invention, commonly runs at about 900 r.p.m.

An ancient lathe recipe

You can build a Eutruscan lathe, if you've a mind to. Take two sturdy posts with conical metal points (or even depressions) set in the sides. Bury the posts in the ground with the roughly rounded turning stock pinned between the two points. See that the wood spins freely, but without any play from side to side.

Now find a stout cord, a jug of cheap wine, and someone who doesn't look busy. Wrap the cord twice around the turning stock and give the two free ends to your assistant. Have him pull alternately on the two ends of the cord to set the wood spinning back and forth. Shape the wood with your chisel as it spins toward you from the top and think good thoughts as it spins back. Use the wine to motivate the motion until the job is done.

The initial improvements to this ancient lathe mainly involved means of keeping the wine to yourself. The simple cord can be stretched in a wooden bow which will allow you to power the lathe with one hand and do without the helper. Still used in many parts of the world, especially in the Middle East, this bow lathe leaves just one hand free to hold the chisel. By using toes as a tool rest, the work is accomplished with efficiency.

The spring-pole lathe

As useful as sit-down bow lathes are to the people of the Middle East, Europeans prefer to stand at their work (perhaps the better to see the boss coming). By attaching one end of the driving cord to a springy sapling pole and the other to a foot treadle, you can power the lathe on the downstroke and allow the spring pole to pull it back when the foot is raised. The rotation still reverses on the upstroke,

Continued on page 87

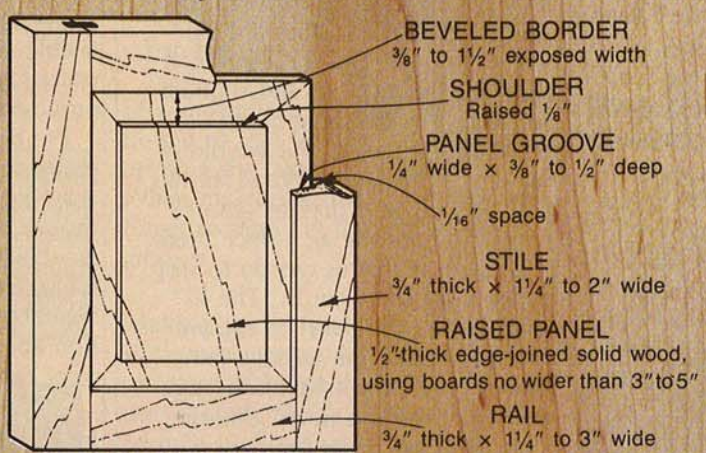
BASIC

RAISED PANEL CONSTRUCTION

Building beautiful raised panels has never been easier. With today's generation of tools, cutters, and some easy-to-master techniques, you can become a panel-raising pro in no time at all. Come on, give it a try; you'll be glad you did!

Raised panel construction looks much more difficult than it actually is. As you can see in the anatomy sketch below, raised panels have only three components: *rails*, *stiles*, and a *panel*. You can fashion all three using any furniture-quality wood you want—softwood or hardwood. We use ¾"-thick material for the stiles and rails, and ½" solid stock for the panels.

Both the stiles and rails have *grooves* along their inside edge to accept the panel, which has a *chamfered border* along each of its edges. Typically, the grooves measure ¼" wide and ⅜" deep.



ANATOMY OF A RAISED PANEL

Continued

HOW TO FIGURE RAIL AND STILE SIZE

The width and length of the rails and stiles depend on two factors: the overall scale of the project and the dimensions of, say, the door opening, if you're building a cabinet door, or the size of the panel if you're using it as a furniture or cabinet carcass component (sides, back, etc.). In the example we've chosen, both the rails and stiles measure 1½" wide. But on larger-scale panels, you'll often see stiles that are as wide as 2", and rails as wide as 3".

Figuring the length of stiles is easy; you just measure the length needed to cover or fill the opening and cut them to length. But with the rails, determining length may call for some math. Here's the formula that applies to the two types of joinery we cover in this article—*tenon spline butt joints* and *molded and coped joints:*

1) Measure total width of frame.
2) Subtract total width of both stiles. The remainder is the length of the rail. (If you are using molded and coped joinery, proceed to step 3.)
3) Add the combined depth of both stile grooves.

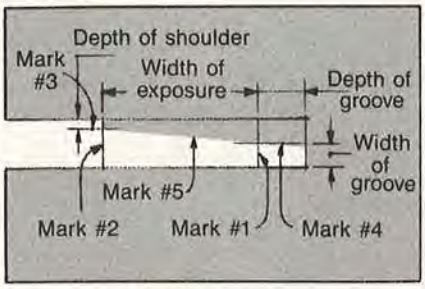
DETERMINE THE PANEL SIZE

Once you know the dimensions of the frame, you can then easily figure the finished size of the panel, too. Just measure the inside distance from stile to stile and rail to rail, add the combined depths of the grooves to the width and height of the panel, then subtract 1/16" from both the width and height. There you have it, almost!

HOW TO FIGURE THE PANEL RAISE AND CHAMFER EXPOSURE

The last things you have to decide are how high to raise the panel and how much chamfer exposure you want. Here again, scale comes into play. Obviously, small-scale panels require a narrower exposure than larger projects. In our example, the exposure measures 1¼" all around, and the *shoulder* (the distance between the face of the panel and the chamfer) is ⅛"—both typical measurements.

The sketch below shows how to make sure that the panel will fit



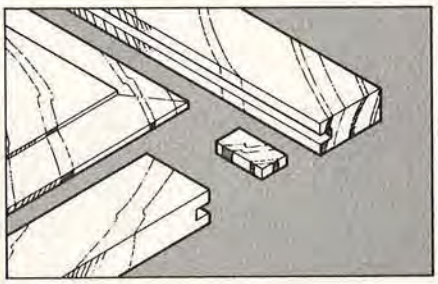
snugly in the frame grooves after you make the chamfer cuts. As you can see, the idea is to ensure that at the point of contact between the frame and the panel the thickness of the panel equals the width of the groove. No matter what panel-raising situation you find yourself in, just follow the 5-step marking sequence shown in the sketch.

WHY RAISED PANELS MUST FLOAT

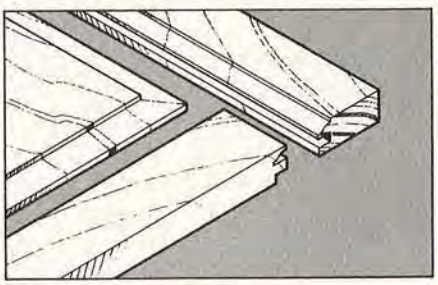
We said earlier that when figuring the final size of the panel, you need to measure the distance between the inside edges of the stiles and between the rails, add the combined depth of the grooves, and subtract 1/16" from the final length and width of the panel. But we didn't say why. The reason: Wood shrinks and expands as it drys or absorbs humidity from the air. Since there is nothing any of us can do to stop it, we must allow for it. The 1/16" space allows the panel to expand without forcing the rail/stile joint apart. That's also why knowledgeable woodworkers never glue the panel into the frame grooves.

TWO BASIC STYLE OPTIONS TO CHOOSE FROM

When building raised panels, you have quite a few options to choose from in terms of how you want to join the stiles to the rails, including various types of mortise-and-tenon joints. But basically, you have only two style options: *squared-edge frames* and *molded-edge frames,* both of which we show below. What we've decided to do in this issue is show you one good, easy way to make each type.



Squared-edge frame



Molded and coped frame

Conceivably, after you've had some experience building raised panels, you may want to try a few modifications (we'll present some of them in future issues). But either of the systems we show here will enable you to produce beautifully crafted raised panels that you'll be proud to show off.

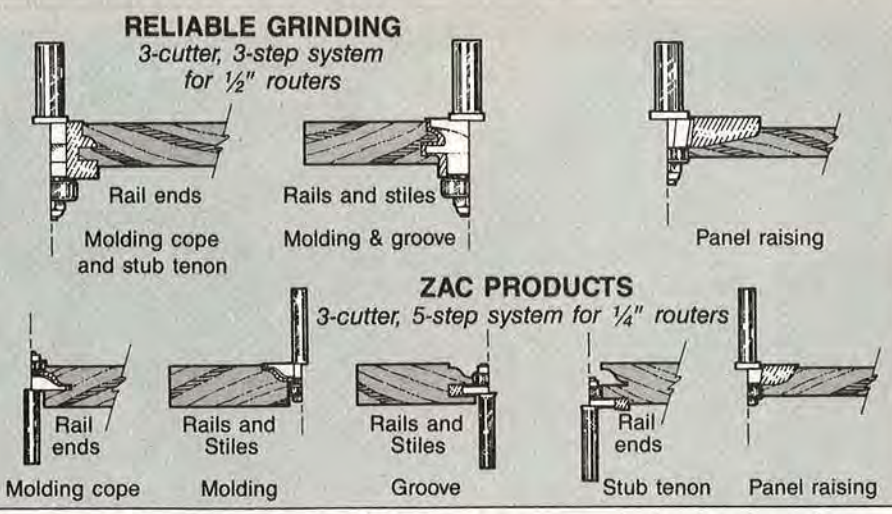
We build the squared-edge type entirely with a table saw or a radial arm saw. The molded-edge type, though, can be accomplished with a combination of table saw and router, or with the router alone. (See the box at right for information about two manufacturers that offer raised-panel cutting systems.)

HOW TO MAKE A SQUARED-EDGE FRAMED PANEL USING TENON SPLINE JOINERY

Make no mistake about it! Just because what you're about to learn is easy doesn't mean that the framed panel you build is in any way inferior. It's not! In fact, we make most of our framed panels using the steps that follow. (You can use a table saw or a radial arm saw to make all the cuts.)

Until recently, you had to have a shaper, or have access to a commercial woodworking shop to make raised panels like the pros do. But that's all changed now. The two systems shown at right allow you to perform all the necessary operations using a router. The Reliable Grinding outfit, a commercial-quality set adapted for use in home workshops ($399 retail), requires that you have a router with ½" shank capacity. With the ZAC system ($89.50 retail) you can order either ¼"- or ½"-shanked bits. We have used both systems in our shop, and both do what the manufacturers claim they will.

These Panel-Raising Systems Do It All



Note: Other manufacturers market panel-raising bits, slotting cutters for cutting grooves, and other bits for making molded cuts, but these are the only integrated systems of which we're aware. For more information, call Reliable Grinding (800-424-9154; in CA call 800-521-8521) or ZAC Products, Inc. (800-441-0101; in NY 800-522-6622).

Preparing the rails and stiles

Start by ripping and crosscutting the stiles and rails to size. (You may want to refer to the section How to Figure Rail and Stile Size.) Then, lay out the pieces as they will be when you finish the panel, and mark the face of each piece as well as each joint line.

After doing this, you can then cut a groove along the inside edge of each member. (Remember: always run the face side against the rip fence so the groove will be in the same position on each frame member.) Now, using the same saw setup, cut grooves along the ends of both rails as shown in the photograph at the bottom of the previous column. Notice that we used a follow block to help push the rails through the saw.

NOTE: To give you the best possible view in our photos, we did not always use safety guards. However, we STRONGLY RECOMMEND that you use safety devices whenever possible in your shop.

A follow block adds stability and prevents chipout of the workpiece

Using scrap material (we use the same wood as that used for the frame pieces), cut the spline material to size. The splines need to be as thick as the grooves are wide and as wide as the combined depth of the grooves, less 1/16" to allow for expansion.

Now, dry-clamp the frame members and splines to check for a good fit and so that you can measure the opening the panel will fit into. When measuring, make sure not to forget to figure in the depth of the grooves.

Making up the panel

With measurements in hand, you can then make up the panel. (We use ½" stock for most of our panels because it allows us to raise the panel and yet not have the face of the panel protrude beyond the face of the frame. We also make up our panels from boards that measure no greater than 4" wide. Doing so allows us to plane or resaw the board thickness down to ½". You also can purchase ½" stock at many lumber outlets and by mail order.) Once you have made up the panel, remove glue squeeze-out and cut the panel according to your measurements.

Raising the panel

Now comes the fun part! Start by laying out the cut marks on one of the panel's edges as described in the section titled "How to Figure the Panel Raise and Chamfer Exposure." Then, set up your saw and make the *shoulder cuts* on the face of the panel as shown below. (You'll want the saw cut to equal the depth of the shoulder.)

Since it's almost impossible to measure a saw blade's bevel to within 1 degree, we crank the blade to

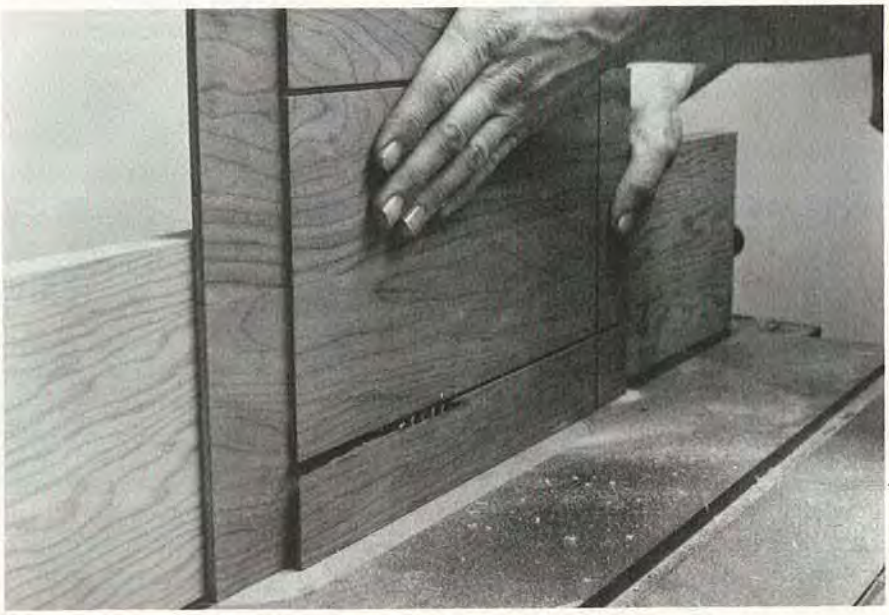
The panel-raising sequence begins when you make shoulder cuts along the edges of the glued-up panel

Continued

an angle and height that looks about right, then we eyeball both as shown below. When we get close, we run some scrap material through the saw, then fine-tune both the angle and height until we're right on the money.

Next, set your rip fence the correct distance from the blade (see the photograph below) and make the chamfer cuts. Notice that we have a zero-clearance insert in place for these cuts; it eliminates the possibility of the panel getting hung up on its way through the blade. Notice also that when running the panel through the saw, we depend on a tall auxiliary fence to steady the panel against (see the photograph above). The photograph at right shows the chamfer cuts being made with a radial arm saw and an 8" carbide blade fitted with a 4" dampening collar.

Eyeball the angle and height of cut, then, using scrap, fine-tune your guess



A wide auxiliary fence helps stabilize the panel

After making all the chamfer cuts, dry-clamp the frame/panel assembly to check for a good fit. Then, cut 1/16" from the width and length of the panel to allow it to move freely in the frame grooves. Since the panel will rest in the bottom groove, we cut 1/16" off the top. This ensures a balanced look when the panel is installed.

Alternate method of cutting the chamfered portion of the panel with a radial arm saw

Determining the position of the rip fence

And finally, sand and otherwise clean up the panel and the inside edge of the frame members. When you're sanding, do so carefully so you don't round over the edges where the pieces join.

HOW TO MAKE MOLDED AND COPED FRAMED PANELS

If you want framed panels that look like those many commercial woodworking shops make with their

shapers, something with a bit more "gingerbread," you'll like the results you'll get with molded and coped framed panels. To clear up any confusion you may have over the words "molded" and "coped," the molded area of the stiles and rails is the decorative edging along the inside edge of the frame. You can mold the outer edge, too, if you want. Coping refers to the cutaway portion at each end of both rails that allows the rails to fit snugly against the stiles. (Note: The procedures shown below apply to the ZAC system; those for the Reliable Grinding system vary somewhat.)

Note: We used a router table for the following operations to ensure accurate cuts.

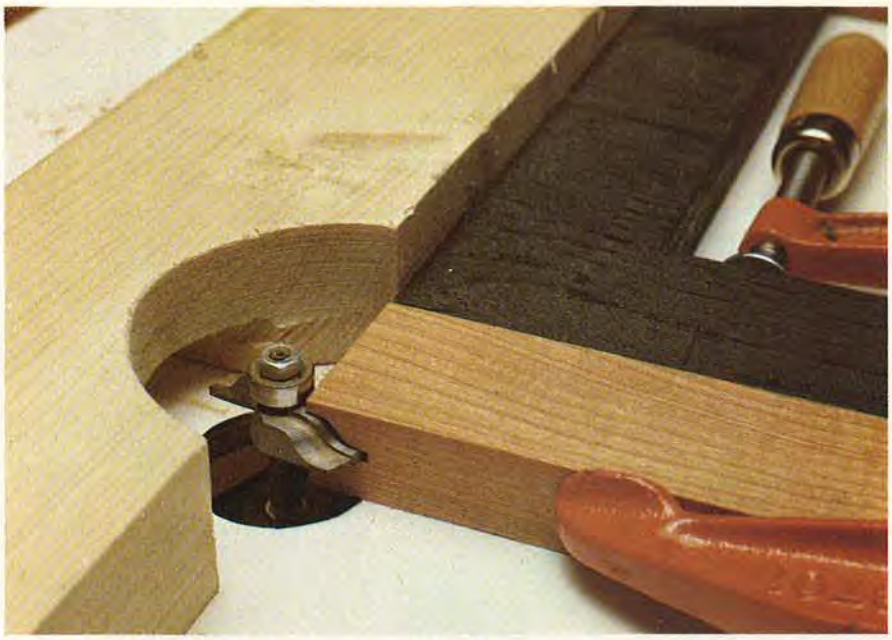
Preparing the rails and stiles

When we make molded and coped frames, we begin by cutting the rails and stiles to size. Then, using scrap stock, we make test cuts as shown in the sketch below to establish the correct height of the bit when making the coping cuts and the molding cuts. Note that you want the shoulder thickness of the cope to match that of the mold. You can now use your scrap pieces as guides to set the height of the cutter as you prepare to cut the frame stock.

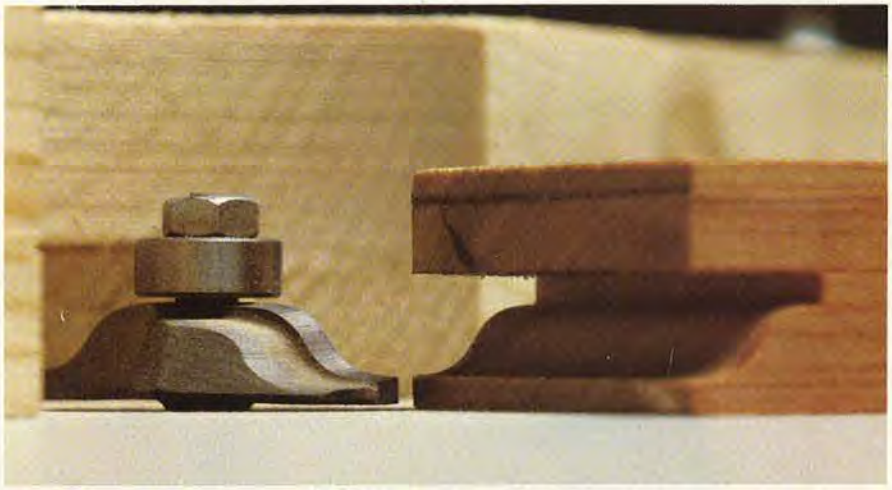
Cope the ends of the rails first (face side up), as shown in the top photograph at right. (Note that we clamp the rails to a follow block to control the cut and minimize splintering.) Then, lower the bit to the correct depth of cut, using your scrap as a guide (see the photograph immediately above), and make the molding cuts along the inside edge of all the frame parts. *Remember to run the stock through the router table face side down.*

Remove the molding bit and insert the slotting cutter. Adjust its height so the groove is centered between the bottom edge of the molding and the back side of the frame member. Run the stiles and rails through the cutter *face side up* (see top photograph, next page).

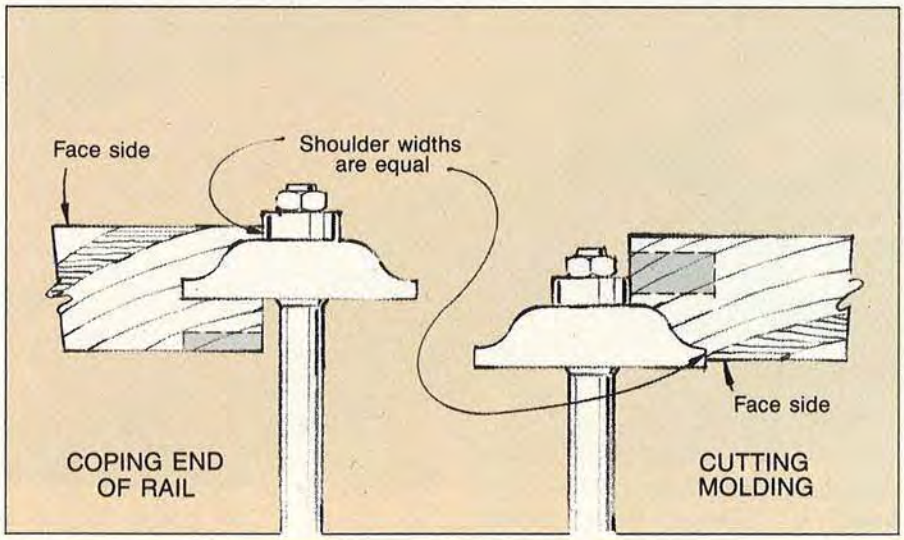
Continued

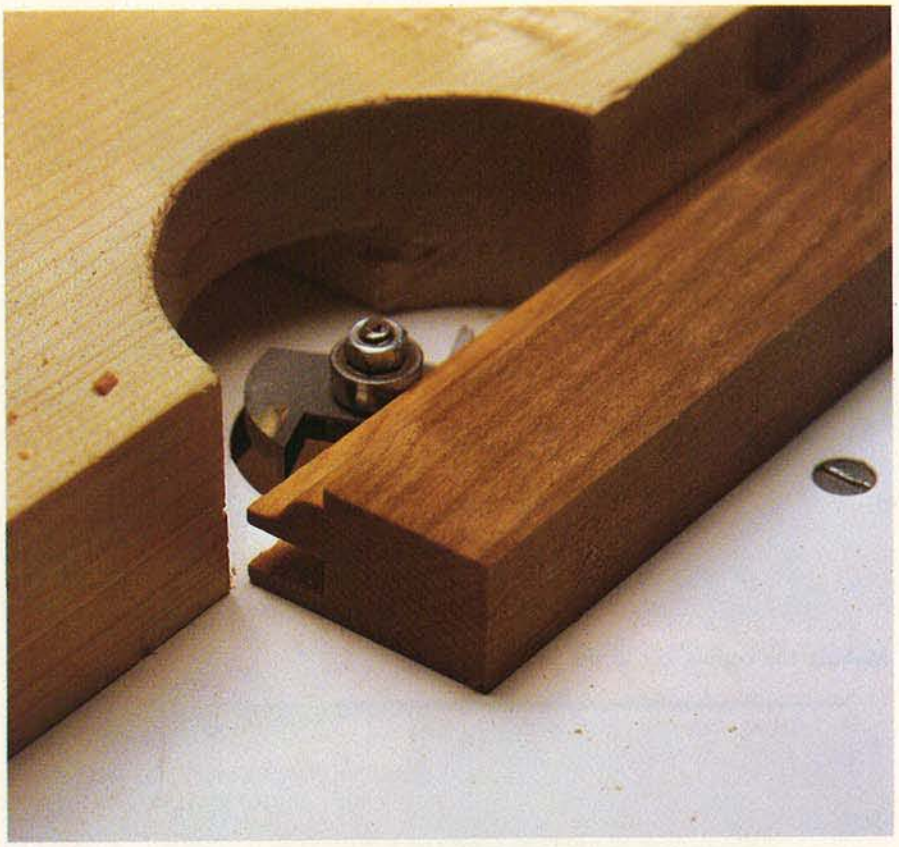


Making the coping cut in the end of the rails



Checking for correct height of bit for molding cuts



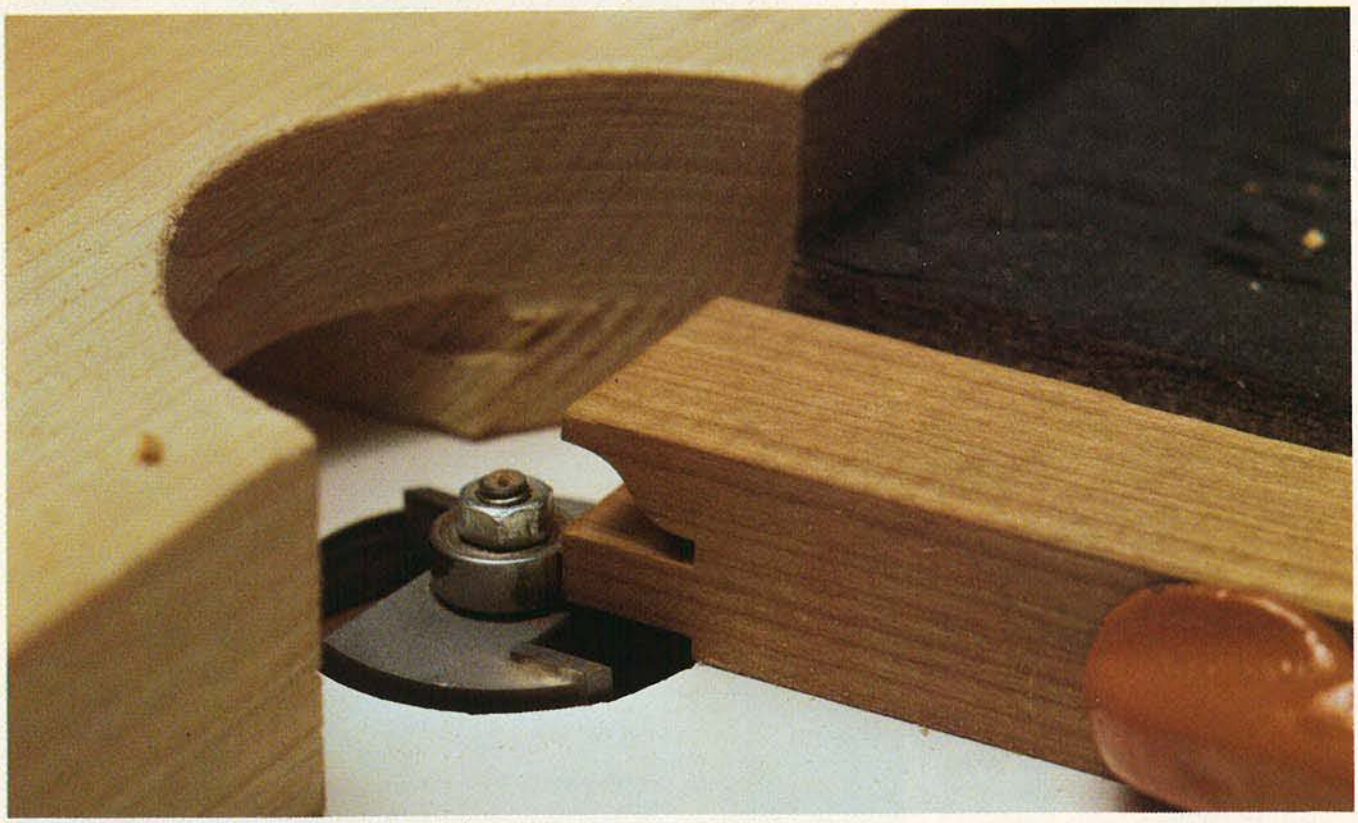


Cutting the grooves in the frame members

And finally, lower the slotting cutter and cut a rabbet along both ends of each rail as shown below. The thickness of the resulting tongue should equal that of the grooves. You should now have a perfectly matched set of rails and stiles.

Making up and raising the panel

After dry-clamping the frame and measuring the dimensions of the panel needed, you make up the panel as described in the earlier section titled "Making up the panel." Then, secure the panel-raising bit in your router, adjust it to the correct height, and raise all four sides of the panel. (It is good practice to rout along the top and bottom of the panel first (across the end grain). Then, when you rout along the panel's sides (with the grain), any previous router tear-out is eliminated.) Dry-clamp the frame and panel together, then trim 1/16" from the height and width of the panel. Clean up the frame and panel, and you're ready for final assembly.

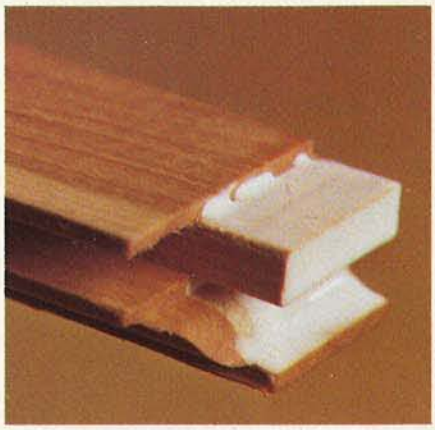


Fashioning the tongue at each end of each rail

FINAL ASSEMBLY OF THE FRAME AND PANEL

Before actually assembling the framed panel, you should stain and seal the panel itself. If you don't do this, you may notice an unsightly bare mark where the panel and frame meet if the panel ever shifts in the frame (and it will).

We mentioned earlier that the panel must float. That means it's very important that when gluing the frame members together you make sure no glue seeps into the grooves. The photograph below shows the surfaces to which you want to apply glue to the rails. Apply glue to the same area of the stiles, too.



Whatever you do, don't allow glue into the frame's grooves

Note: You may want to drop a few beads of clear silicone sealant into the rail and stile grooves before assembling the panel to prevent rattling.

Glue and clamp the frame and panel, then lay the unit across a couple of sawhorses and check for square and to see if the panel has accidentally twisted (see the photograph, top right). If you can see any daylight under either end of the square, shim the panel as needed and clamp it to the sawhorses.

After the glue has dried, do any final cleanup. (We have found that often it's necessary to use a cabinet scraper—pushed diagonally across the joint lines; see the photograph at right—to even out minor height differences.) Then, apply the finish of your choice. ■

If panel twists during assembly, shim it into adjustment

To even the surface at the joint lines, scrape diagonally with a cabinet scraper

Oak Raised Panel LIBRARY TABLE

Design: Dave Ashe
Photographs: Bob Calmer; Bill Hopkins Associates
Illustrations: Bill Zaun

Print this article

Distinctive raised-panel pedestals and a nicely tailored oak and plastic laminate tabletop combine to make this traditional library table a project of extraordinary merit

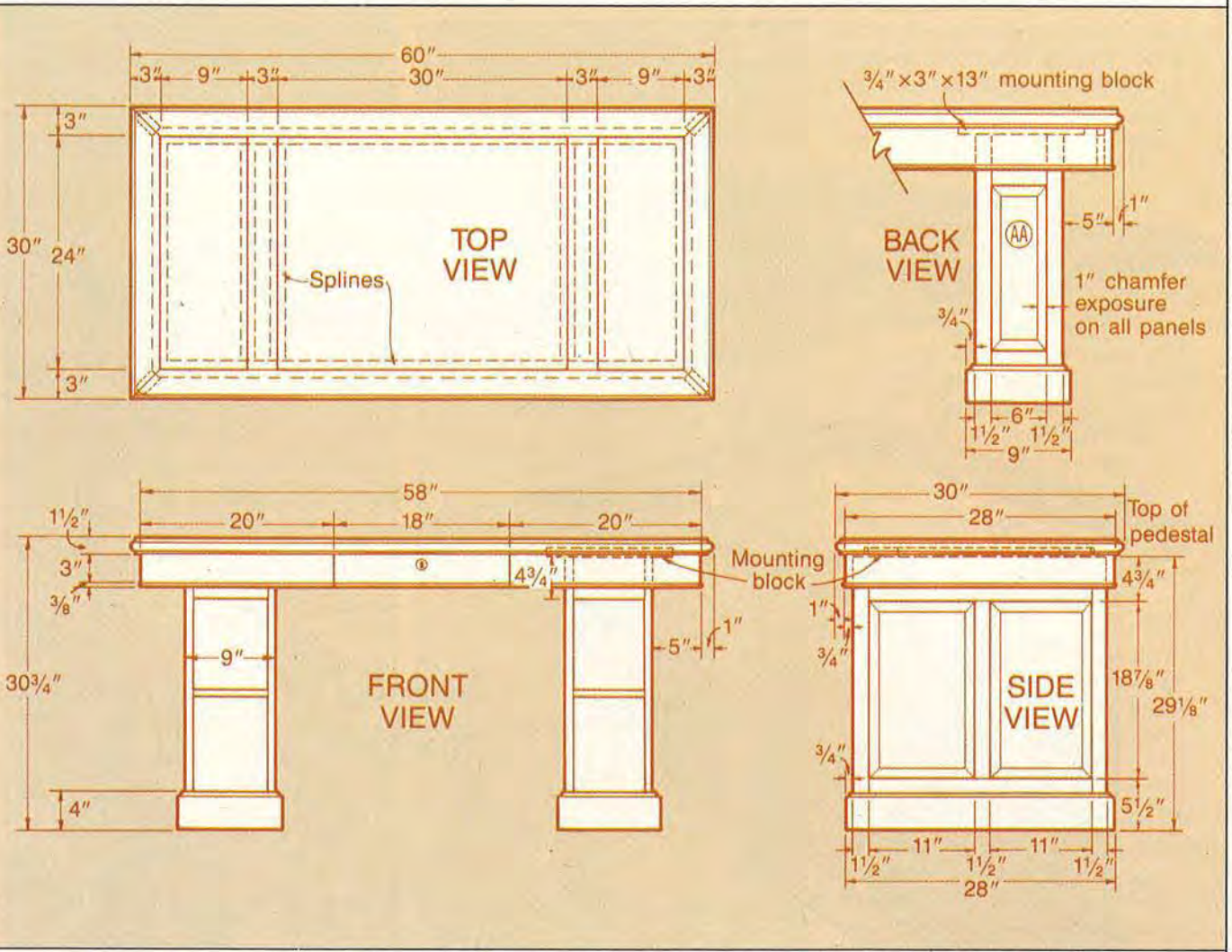
Building the top

1 Cut the plywood center panel (A) and the two plywood side panels (B) to finished size.

2 Cut the plastic laminate (C, D) and balance sheet (E, F) to size plus 1″ longer and 1″ wider.

3 Apply two coats of contact cement to the top of the plywood piece (A) and to the back side of plastic laminate (C); let dry between coats. Then apply the laminate. (You may want to enlist a helper when you position the laminate on the plywood to ensure that it overlaps the plywood on all sides.) Trim the overlap using a router fitted with a flush-cutting laminate trimmer.

4 Glue the balance sheet to the bottom of the plywood, then trim it as you did with the plastic laminate. (The balance sheet stabilizes the panel and reduces the



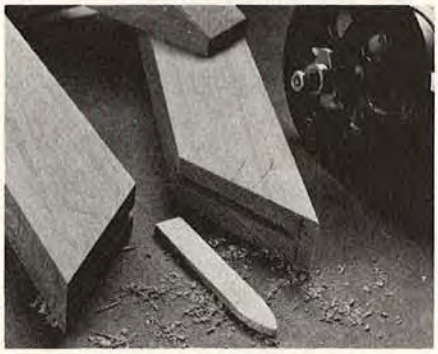
chances of warpage.) Apply the laminate and balance sheet to the side panels (B), then trim the excess.

5 Rip the front and back rails (G) and the end rails (H), then crosscut to length plus 1". Cut the panel divider pieces (I) to size.

6 Using either a table saw fitted with a dado blade or a router and a slotting cutter, cut ¼" grooves ½" deep, centered, along all four edges of the three laminated panels and the dividers (I). Also cut like-sized grooves along the inside edge of the red oak rails (G, H). (It's vital when cutting the grooves to keep the tops of the pieces against the table saw fence, or against the base of the router, to ensure that the grooves line up. Otherwise, you may end up with pieces that don't fit together flush on the top side. Cut scrap material to experiment if necessary.)

7 Cut ¼" hardboard splines 15/16" wide for all spline grooves. Dry-clamp the three panels and dividers together, checking that all edges are flush. Dry-clamp the front and back rails (G) to the assembly and mark the location of the miter joints. Cut the miters on the ends of both G pieces. Reclamp the mitered front and back rails to the assembly. Now position the end rails (H) under the assembly and along the ends, mark the position of the miters, and cut to size.

Cut the stopped-spline groove along the miter joints (we measured the stop mark and used a router to cut the stopped spline groove as shown in photo at right), then cut the hardboard splines to fit the miter joints. Dry-clamp the rails (G, H) in place to check the fit of all the joints, and check that all the pieces fit flush across the top.



Tenon spline joinery fortifies an otherwise weak miter joint

8 Remove the clamps and glue the splines in the grooves in the panels, then glue and position the dividers between the panels. Apply glue in the grooves and to the rails, install the splines in the mitered ends, and clamp the rails (G, H) to the three-panel assembly.

9 After the glue has formed a tough skin, remove any excess.

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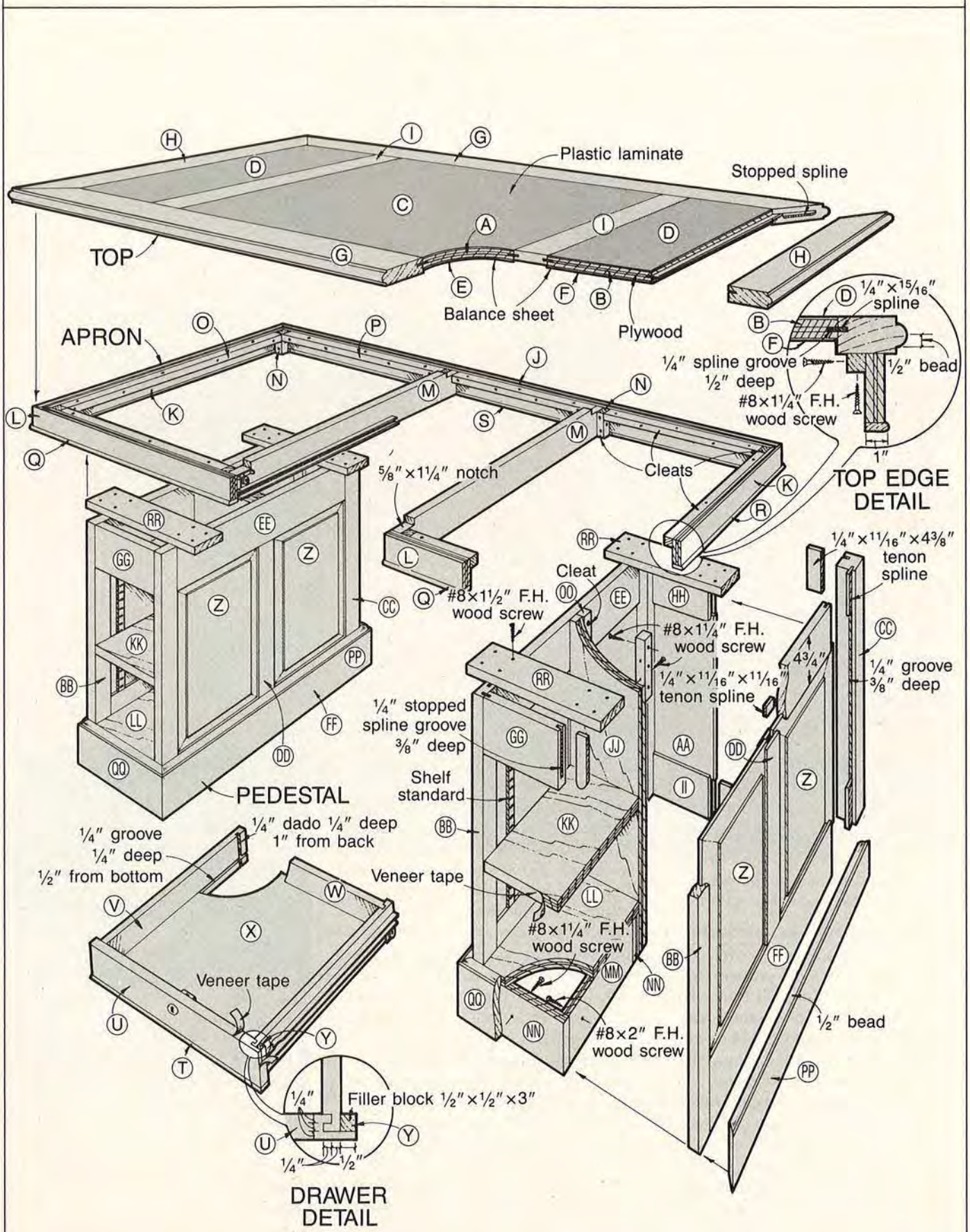

TOP
Plastic laminate
Stopped spline
Balance sheet
Plywood
APRON
PEDESTAL
5/8" x 1 1/4" notch
Cleats
#8 x 1 1/2" F.H. wood screw
Cleat
#8 x 1 1/4" F.H. wood screw
1/4" x 11/16" x 4 3/8" tenon spline
1/4" x 11/16" x 11/16" tenon spline
1/4" groove 3/8" deep
4 3/4"
1/4" stopped spline groove 3/8" deep
Shelf standard
1/4" dado 1/4" deep 1" from back
1/4" groove 1/4" deep 1/2" from bottom
Veneer tape
#8 x 2" F.H. wood screw
1/2" bead
Filler block 1/2" x 1/2" x 3"
DRAWER DETAIL
1/4" x 15/16" spline
1/4" spline groove 1/2" deep
1/2" bead
#8 x 1 1/4" F.H. wood screw
1"
TOP EDGE DETAIL

Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
TOP					
A	3/4"	24"	30"	fir plywood	1
B	3/4"	9"	24"	fir plywood	2
C*	1/16"	24"	30"	plastic laminate	1
D*	1/16"	9"	24"	plastic laminate	2
E*	1/16"	24"	30"	balance sheet	1
F*	1/16"	9"	24"	balance sheet	2
G*	1 1/2"	3"	60"	red oak	2
H*	1 1/2"	3"	30"	red oak	2
I	3/4"	3"	24"	red oak	2
APRON ASSEMBLY					
J	3/4"	3"	58"	red oak plywood	1
K	3/4"	3"	28"	red oak plywood	2
L	3/4"	3"	20"	red oak plywood	2
M	3/4"	3 5/8"	26 1/2"	fir plywood	2
N	3/4"	3/4"	3"	pine	8
O	3/4"	3/4"	25"	pine	2
P	3/4"	3/4"	18"	pine	1
Q*	3/8"	1"	20 1/4"	oak	2
R*	3/8"	1"	28 1/2"	oak	2
S*	3/8"	1"	58 1/2"	oak	1
T*	3/8"	1"	17 3/4"	oak	1
DRAWER					
U*	3/4"	3"	17 3/4"	oak plywood	1
V	1/2"	3"	17 7/8"	oak	2
W	1/2"	2 1/4"	16 1/4"	oak	1
X	1/4"	17 5/8"	16 1/4"	oak plywood	1
Y	1/2"	1/2"	3"	oak	2

Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
PEDESTALS					
Z*	1/2"	11 11/16"	19 9/16"	oak	8
AA*	1/2"	6 11/16"	19 9/16"	oak	2
BB	3/4"	1 1/2"	29 1/8"	oak	4
CC	1 1/2"	1 1/2"	29 1/8"	oak	4
DD	3/4"	1 1/2"	18 7/8"	oak	4
EE	3/4"	4 3/4"	23 1/2"	oak	4
FF	3/4"	5 1/2"	23 1/2"	oak	4
GG	3/4"	4 3/4"	7 1/2"	oak	2
HH	3/4"	4 3/4"	6"	oak	2
II	3/4"	5 1/2"	6"	oak	2
JJ	3/4"	7 1/2"	29 1/8"	oak plywood	2
KK	3/4"	12 3/8"	7 3/8"	oak plywood	2
LL	3/4"	12 1/2"	7 1/2"	oak plywood	2
MM	3/4"	3 1/4"	11"	fir plywood	4
NN	3/4"	3 1/4"	7 1/2"	fir plywood	4
OO	3/4"	3/4"	4 3/4"	oak	4
PP*	3/4"	4"	28"	oak	4
QQ*	3/4"	4"	10 1/2"	oak	4
RR	3/4"	3"	13"	oak	4

*Some parts are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

Supplies: White glue, 1/4" hardboard for splines, Knape Vogt 1300—16" drawer slides, drawer lock, brads, shelf standards, #8×1 1/4" flathead wood screws, #8×1 1/2 flathead wood screws, #8×2" flathead wood screws, stain, polyurethane

Cutting list

1 Piece — 3/4"×48"×96" FIR PLYWOOD
1 Piece — 30"×72" PLASTIC LAMINATE
1 Piece — 30"×72" BALANCE SHEET
5 Pieces — 3/4"×7 1/4"×96" RED OAK
1 Piece — 1 1/2"×7 1/4"×96" RED OAK
1 Piece — 1 1/2"×7 1/4"×36" RED OAK
3 Pieces — 1/2"×9 1/4"×96" RED OAK
1 Piece — 1/4"×24"×24" RED OAK PLYWOOD
1 Piece — 3/4"×48"×96" RED OAK PLYWOOD
1 Piece — 3/4"×7 1/4"×48" PINE

When the glue is thoroughly dry, remove the clamps and any remaining glue. Using a 1/2" round-over bit, rout a bead on the top and bottom edges of the rails as shown in the Top Edge Detail. Sand the top assembly, being careful not to sand the plastic laminate.

Building the apron assembly

1 Rip, then crosscut the back apron (J) and the end aprons (K) to size plus 1" in length. Rip a piece of oak plywood to 3", and crosscut it to 60". Now, cut one 21"-long piece from each end. (These two end pieces are the front aprons [L]. Set aside the remaining middle piece; you'll use it later as the drawer front. This ensures a continuous flow of grain across the front aprons and drawer.)

Now, miter both ends of the back and end aprons, and one end of each of the front aprons. Cut the drawer guide rails (M) to size, then cut 5/8"×1 1/4" notches in each end of both rails.

2 Cut the pine cleats (N, O, P) to size. Drill pilot holes through the cleats for mounting to the underside of the top and to the aprons.

3 Using #8×1 1/4" wood screws, fasten the corner cleats (N) to the inside corners of the mitered joints, and at the same time glue the apron miters together. Glue and screw cleats (O, P) to the aprons. Finally, mount the drawer guide rails (M) to the assembly.

4 Flip the top upside down, then center the apron on the top. The top overhangs the apron 1" on all sides. Fasten the apron assembly to the underside of the top.

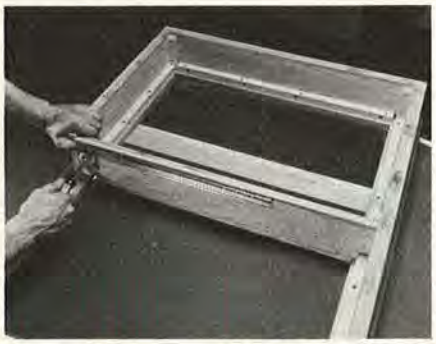
5 Cut the front trim pieces (Q), the end pieces (R), the back piece (S), and the door front bottom piece (T) to size plus 1" in length. (To obtain the 3/8" stock, we ripped 3/4" thick oak to 1" width. Then, using a feather board and a push stick, we resawed the pieces on the table saw, ending up with pieces measuring 3/8"×1".)

Form the round-over along one edge of all the trim pieces with a 3/16" round-over bit. (We cut ours on a router table with a fence.) Miter

Continued

the ends, then glue and brad into position on the bottom of the aprons. Set the drawer front trim piece (T) aside for the time being.

6 Attach the drawer slides to the guide rails (M) as shown in the photo below. Sand the entire assembly smooth.



Mount the drawer slides flush with the bottom of the guide rails

Building the drawer

1 Crosscut the previously cut drawer front (U) (cut in step 1 of *Building the apron assembly*) to length. Then, rip and crosscut the drawer sides (V), back (W), and bottom (X) to size.

2 Cut a ¼" groove ¼" deep and ½" up from the bottom along pieces U and V as shown in the Drawer Drawing. Cut a ¼" dado ¼" deep and 1" from the back on the drawer sides (V). On the front ends of the sides, cut a ¼" dado ¼" deep and ¼" from the front (see the Drawer Detail Drawing).

3 Using a follow block or tenon jig, push the drawer front through the table saw to cut a ¼" dado 1" deep on both ends. Trim one of the tongues on each end so it's only ¼" long. Also, cut the filler blocks (Y) to size.

4 Dry-clamp the drawer parts and check the fit. Glue and clamp the drawer together. After the glue dries, remove the clamps, sand the drawer smooth, and apply oak veneer tape where shown in the Drawer Drawing. Install the lock in the drawer front. Cut trim piece T to length, then glue and brad it to the bottom of the drawer front.

Building the pedestals

1 Rip oak stock for the eight raised panels (Z) and two end panels (AA). (We used ½" oak stock for the raised panels. You can either resaw or plane thicker stock to size or special order it through your local lumber yard or mail order it. When ripping the stock for panels, we try to keep the pieces under 4" width for a more stable finished panel. We cut each piece to length plus 1" and to width plus ¼". The finished size of the panels is listed in the Bill of Materials.)

2 Lay out each panel and match the pieces together for uniform grain pattern and color. Mark each panel for ease in assembling later. When laying the panels out, check the mating surfaces between the boards and joint if necessary.

3 Glue and clamp each panel together, being sure that the pieces used to make up the panel are lying flat on the clamps (this helps ensure a flat panel).

4 Cut the front stiles (BB), rear stiles (CC), mullion (DD), top rails (EE), and bottom rails (FF) to size. Now, cut front rails (GG), back top rails (HH), and back bottom rails (II) to size.

5 Cut a ¼" stopped groove ⅜" deep and 4" long along the top edge of BB and both ends of GG. Cut ¼" grooves ⅜" deep along the edges and ends of DD, and along one edge and both ends of EE, FF, HH, and II. Cut a ¼" groove ⅜" deep and ¼" back from the face on two edges of CC. Cut ¼" hardboard splines for the spline-groove joints.

6 Cut the panels to size. Then, referring to our shop-tested techniques on cutting raised panels (see page 45), form the edges of the raised panel.

7 Dry-clamp the stiles (BB, CC), mullions (DD), rails (EE, FF), hardboard splines, and panels (Z) together, and check the fit. Adjust if necessary, then glue and clamp the four pedestal side assemblies together, being sure that you check them for square.

8 After the glue has dried, remove the clamps and excess glue. Now, dry-clamp the side assemblies together, using parts AA, GG, HH and II. Check for square with a try square.

9 Cut the center divider (JJ), adjustable shelves (KK), bottom shelves (LL), and base pieces (MM, NN) to size. Check the fit of the divider, adjustable shelf, base shelf, and base pieces in the dry-clamped pedestal. All the pieces (except for the adjustable shelf which floats) should fit snugly without forcing the pedestal assembly out of square.

10 Glue and nail base pieces MM and NN together.

11 Remove the clamps, then glue the side assemblies together using the hardboard splines, rails (GG, HH, II), raised panel (AA), and base assembly (MM, NN). Reclamp and check for square.

12 After the glue has dried, remove the clamps and excess glue. Cut the cleats (OO) to size, then drill pilot holes through the cleats for mounting to the divider (JJ) and the top rails (EE). Using #8 × 1¼" wood screws, fasten the cleats to the divider. Install the divider between the side assemblies and screw to the sides of the top rails and to the back of NN.

13 Cut base molding pieces (PP, QQ) to size plus 1" in length. Using a router fitted with a ½" round-over bit, rout the decorative edge on the pieces. Now miter each end of each piece to fit around each pedestal. Screw the molding pieces to the base from the inside of the base assembly (MM, NN) as depicted in the exploded-view drawing.

Finishing and final assembly

1 Finish-sand the top, drawer, and pedestals. Carefully mask off the laminate, then stain if desired and apply several coats of finish (we used satin polyurethane varnish).

2 Fasten the shelf standards to the backside of the raised panels Z, then attach the drawer slides to the sides of the drawer.

3 Cut the mounting blocks (RR) to size and fasten to the top of each pedestal. With the top upside down on a blanket to prevent scratching , position the pedestals and screw them to the top. ■

Print this article

news and events

News of interest to woodworkers and dates of national and regional events must be received at least three months before our publication date to be considered for the News and Events section. Send information to: News and Events, Better Homes and Gardens® WOOD Magazine, Locust at 17th, Des Moines, IA 50336.

May 16–18

Mid-West Tool Collectors Association Spring Meeting

Location: Eastern Illinois University, Charleston, Illinois

Antique and old-tool swapping, sales, lectures, and demonstrations. For more information, write Gary Gergini, 520 Pennsylvania St., Windsor, IL 61957.

May 30–June 2

Early American Industries Association Semiannual Meeting

Location: Bath, Maine

An emphasis on old seafaring ways chronicled by Bath's Maine Maritime Museum. Seminars, tours, and lectures focus on this industry. For more information, contact John S. Watson, Early American Industries Association, P.O. Box 2128, Empire State Plaza Station, Albany, NY 12220.

June 7–9

Oklahoma City Wood Carving Show

Location: Heritage Park Mall, Reno at Air Depot Boulevard, Midwest City, Oklahoma

Wood carvers from nine states exhibit and compete for awards in this show sponsored by the Oklahoma City Wood Carvers. Hours: 9 a.m. to 9 p.m. Friday, Saturday; 12 noon to 6 p.m. Sunday. For information, write Jim Crist, 2000 N. Purdue, Oklahoma City, OK 73127.

Photograph: Courtesy of The Woodworking Show, Los Angeles

Spectators watch a demonstration at a California woodworking show. Shows usually offer exciting new tools, supplies, and seminars

June 17–19

Springfield Summer Market

Location: Springfield Armory and Community Center, Springfield, Massachusetts

Admission: $2

Fine crafts for retail sale from a host of exhibitors. Hours: 10 a.m. to 6 p.m. daily. For more information, phone 914/469-2248.

June 20–July 7

Designs in Wood Exhibition

Location: Southern California Exhibition, Del Mar Fairgrounds, Del Mar, California

Admission: $4

Juried examples of functional furniture by woodworkers from San Diego and Imperial counties; also extensive high school industrial arts works nearby. Hours: 10 a.m. to 10 p.m. Monday through Thursday; 10 a.m. to 11 p.m. weekends. Phone 619/755-1161.

June 21–23

American Craft Council Craftfair

Location: Eastern States Exposition Center, West Springfield, Massachusetts

Admission: $5

For 20 years, this craft fair has attracted hundreds of exhibitors and thousands of visitors. Hours: 11 a.m. to 7 p.m. Friday and Saturday; 11 a.m. to 6 p.m. Sunday. For more information, call American Craft Enterprises, Inc., 914/255-0039.

June 28–30

The Woodworking Show for Craftsmen and Hobbyists

Location: Merchandise Mart, Denver, Colorado

Admission: $5

Tools, machines, supplies, technique seminars, and special exhibits by woodworkers and wood carvers highlight this show. Hours: 12 noon to 9 p.m. Friday; 10 a.m. to 6 p.m. Saturday and Sunday. For more information, phone The Woodworking Show for Craftsmen and Hobbyists, 213/477-8521.

Worth Noting:

Redwood Fences, *an information-packed booklet on building and finishing of fences and selecting the right wood is available for 70 cents from the California Redwood Association, 591 Redwood Highway, Suite 3100, Mill Valley, CA 94941.* ■

PINT-SIZED PICNIC TABLE

Design: Bob Sellers Photographs: Bob Calmer Illustrations: Bill Zaun

If you get a kick out of seeing kids' faces light up with delight, wait until you give that special someone this special something. Just the right size for a cookout with Mom and Dad, or for a little summertime tea-partying or bubble-blowing, this durable creation requires only four 16-foot 2×4s and a few dollars' worth of hardware to build.

Note: We used pressure-treated lumber for this project, but you could use redwood, cedar, or cypress with equal success. The wood you choose depends on the final look you prefer and your budget for this project. Cut the pieces as indicated in the Cutting Diagram to get all the parts from four 2×4s.

Assembling the tabletop

1 Using 2×4 stock, cut the tabletop pieces (A) and tabletop supports (B, C) to length. Trim the bottom ends of the tabletop supports at a 45° angle as shown in the exploded-view drawing. Cut the angled aluminum stock to size and file off any sharp edges.

2 Rip a strip of scrap stock to ⅝", then cut it into 2" lengths for later use as spacers.

3 Set the ¾" pieces of aluminum that you cut in step 1 on each side of each tabletop support (B). Drill pilot holes and screw the aluminum to the supports using #8×1¼" wood screws.

4 Choose the best face of the top pieces (A) and lay them facedown on the floor. Insert the scrap spacers between the tabletop pieces, and clamp the assembly together (make sure the ends of A are flush).

Position the tabletop supports 7″ in from each end of the tabletop, then using #8×1¼″ wood screws, fasten the two supports to the tabletop.

5 Mark the center between the supports, then position and screw the center support (C) to the underside of the table at that point using #10×2″ wood screws.

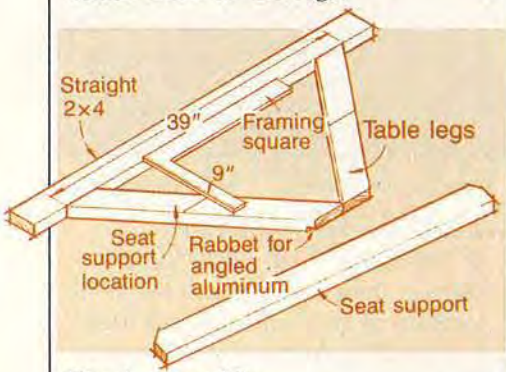
Attaching the legs

1 Cut the seat supports (D) and seats (E) to length; cut the legs (F) to length plus 2″. Then, fashion the diagonal braces (G) by crosscutting a 2×4 piece to 20″ and ripping it in half.

2 Cut one end of each of the legs (F) at a 38° angle, then cut the other end at the same angle to a finished overall length of 30″.

3 Cut a ¾″ rabbet ¼″ deep on the top outside end of each of the legs to allow room for the angled aluminum that's mounted to the supports. (We clamped the legs to the radial arm saw table and used a dado blade to make the rabbet. You can also make the rabbet with a mallet and chisel, or with a router fitted with a straight bit.)

4 Position the two legs on a flat surface as shown in the Leg Marking Drawing, flush against a straight 2×4 or a wall. Now, measure up 9″ on each leg and mark the location of the top of the seat support (D). Center the seat supports on the legs, then drill ¼″ holes and attach them to the legs.



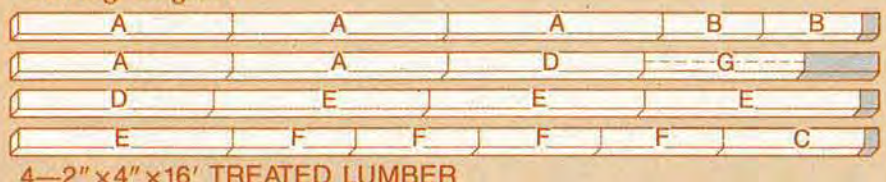
Final assembly

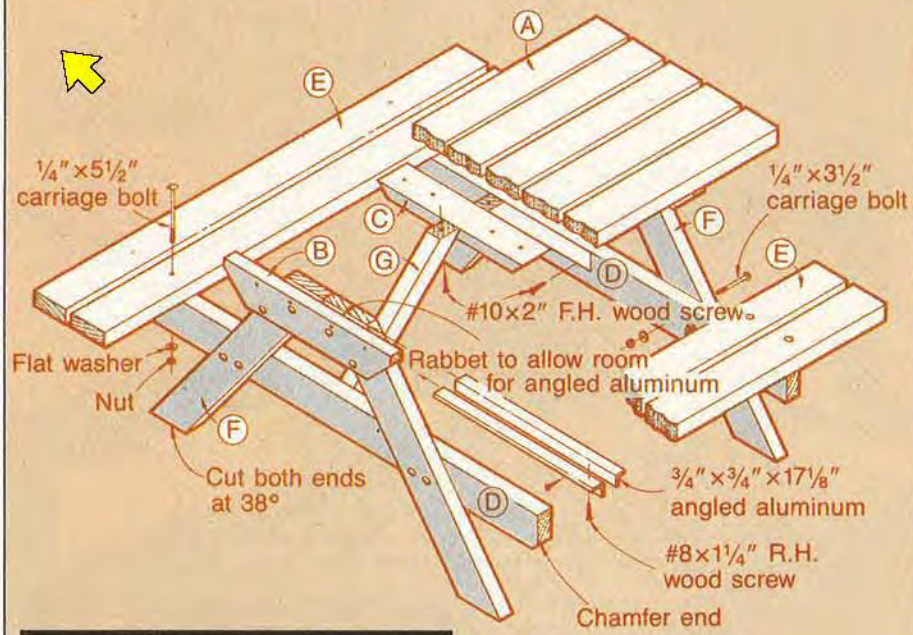
1 Clamp the leg assemblies to the inside of the tabletop supports and drill ¼″ holes through the supports and the legs. Fasten the legs to the supports with ¼″×3½″ carriage bolts.

2 Clamp the seats (E) to the seat supports (see the End View Drawing for positioning). Drill ¼″ holes through the supports and seats, then fasten the seats to the supports using ¼″×5½″ carriage bolts.

3 To further stabilize the table, cut each end of the braces (G) to 45° and to length to fit between the center brace and seat supports. Drill pilot holes and connect the pieces with #10×2″ wood screws.

4 Using a belt sander or sanding block, round-over all sharp edges. Finish, if desired, or let the wood age naturally. ■



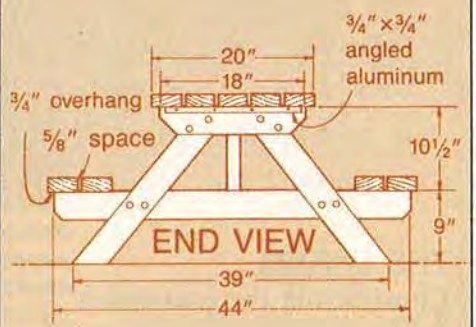


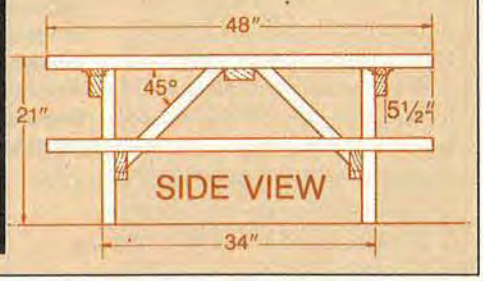
Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
A	1½″	3½″	48″	treated lumber	5
B	1½″	3½″	18″	treated lumber	2
C	1½″	3½″	18″	treated lumber	1
D	1½″	3½″	44″	treated lumber	2
E	1½″	3½″	48″	treated lumber	4
F*	1½″	3½″	30″	treated lumber	4
G*	1½″	1½″	16½″	treated lumber	2

*Some parts are cut larger initially, then trimmed to finished size. Please read the instructions before cutting.

Supplies: 36—#8×1¼″ R.H. wood screws, 4—#10×2″ F.H. wood screws, 8—¼″×5½″ carriage bolts, 16—¼″×3½″ carriage bolts, 24—¼″ flat washers, 24—¼″ nuts, 4 pieces—⅛″×¾″×¾″ cut to 17″ angled aluminum stock (available at most hardware stores)





FRONT-ROW SEATING FOR Summertime Fun

Ready to scrap your scruffy old lawn furniture for something more stylish? Then head for the workshop and build these beauties. The easy elegance comes from clean lines and a high-gloss finish, yet only simple construction techniques are required. There's still time to start before summer, so take a seat . . . on *WOOD*.

Photographs: Bob Calmer Illustrations: Bill Zaun

THE CHAIRS

Constructing the framework

1 Rip ¼" from each edge of all 2×4 stock, so you end up with a 3" finished width. (This removes the factory-rounded edges and lets you make tighter-fitting, better-looking joints.) Then crosscut the legs (A, B) and top rail (C) to size. Crosscut bottom rail (D) to size plus 1".

2 Measure and mark the half-lap joint locations as shown in the Side Section Drawing. Using a dado blade on the radial arm saw or table saw, test-cut half-lap joints on the ends of two pieces of scrap wood of the same thickness as the dimensioned redwood stock. Check the fit of the two pieces against each other and adjust the depth of cut if necessary. Now clamp a stop to the saw fence 3" from the blade and cut the joints on the top ends of A and B, and both ends of C.

3 Dry-clamp A, B, and C on a flat surface, then measure and mark the location of the half-lap joints used to join D to A and B (see the Side Section Drawing for dimensions). Cut the angled half-lap joints in A, B, and D.

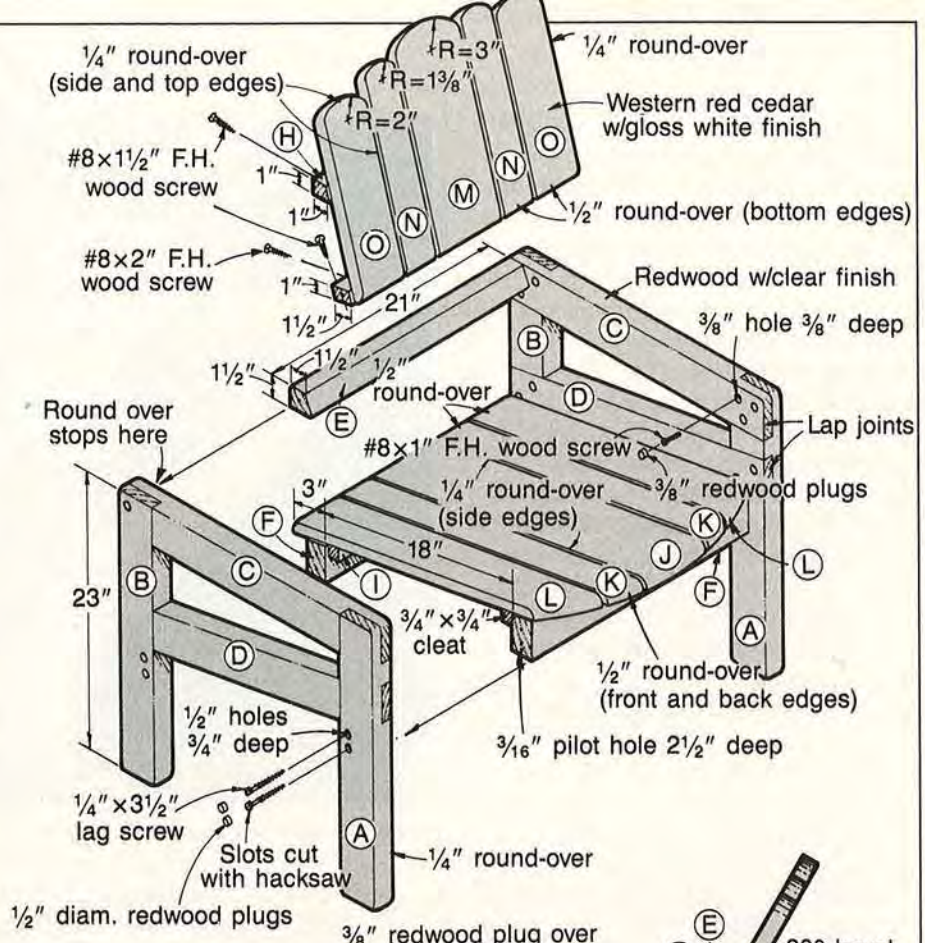
4 Tape the exposed end grain at the half-lap joints. (The masking tape protects the wood from epoxy squeeze-out, which causes unsightly

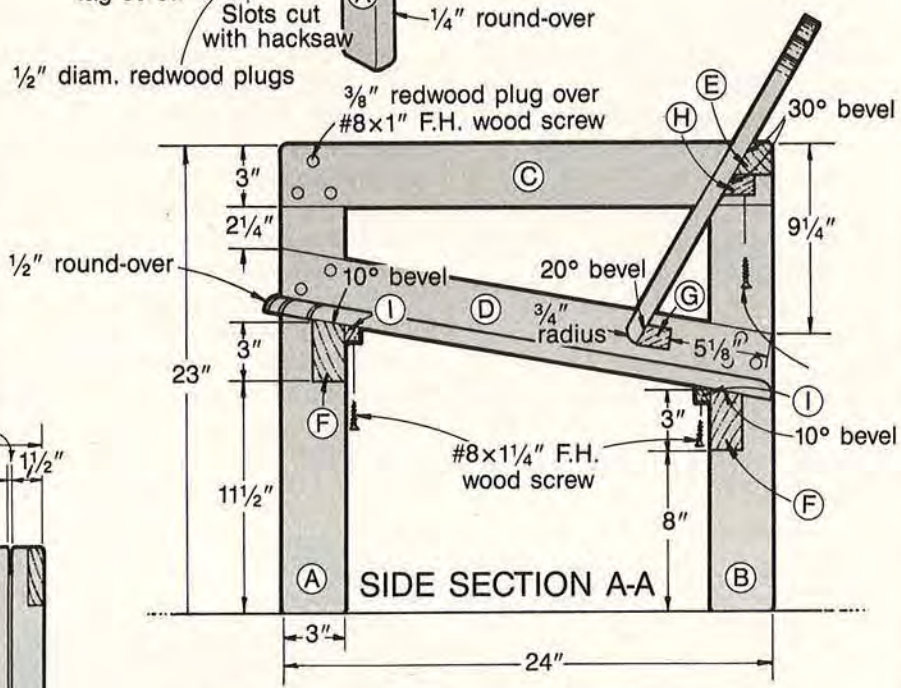
Bill of Materials

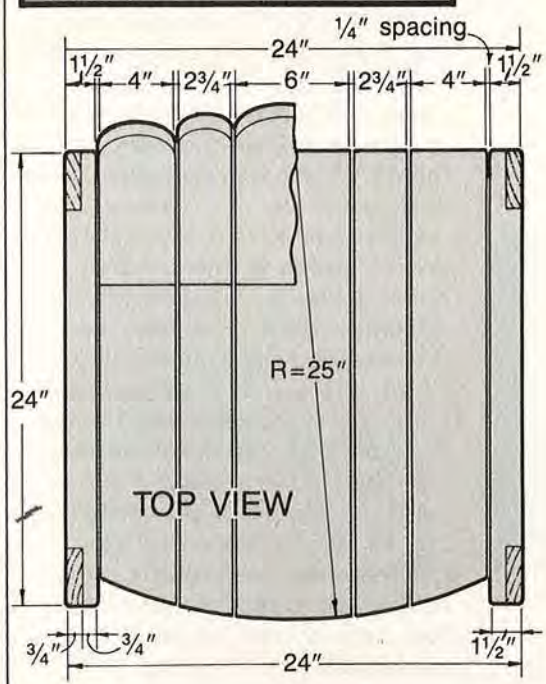
Part	Finished Size* T	W	L	Material	Qty.
For One Chair					
A	1½"	3"	23"	redwood	2
B	1½"	3"	23"	redwood	2
C	1½"	3"	24"	redwood	2
D*	1½"	3"	24¾"	redwood	2
E	1½"	2½"	21"	redwood	1
F	1½"	3"	21"	redwood	2
G	1"	1½"	21"	redwood	1
H	1"	1½"	21"	redwood	1
I	¾"	¾"	21"	western red cedar	2
J*	¾"	6"	25"	western red cedar	1
K*	¾"	2¾"	25"	western red cedar	2
L*	¾"	4"	25"	western red cedar	2
M*	¾"	6"	18"	western red cedar	1
N*	¾"	2¾"	16½"	western red cedar	2
O*	¾"	4"	15¼"	western red cedar	2

*Some parts are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

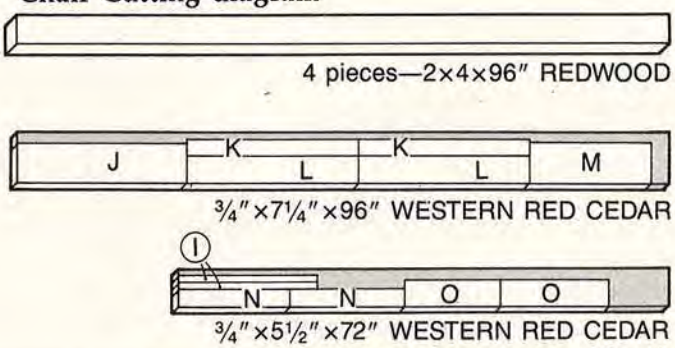
Supplies: epoxy, 10—¼"×3½" lag screws, 20—⅜" redwood plugs, 10—½" redwood plugs, 28—#8×1¼" flathead wood screws, 25—#8×2" flathead wood screws, 20—#8×¾" flathead wood screws, 2—#8×1½" flathead wood screws, ⅜" redwood plugs, white exterior enamel, redwood stain, clear exterior finish







Chair Cutting diagram



Continued

marks after finishing.) Epoxy and clamp the two chair sides together, checking for square. (We chose epoxy for its weatherability and strength. We also wore plastic gloves, since it's hard to remove epoxy from your bare hands.) Let the epoxy dry thoroughly before further machining.

5 Prebore holes for the #8×¾" wood screws and ⅜" redwood plugs at the joints on the inside face of the chair sides where shown in the exploded view drawing. Dip the screw threads in epoxy, then drive the screws, counterboring the screw-heads. Cut ⅜" redwood plugs, then epoxy them in place to conceal the wood screws.

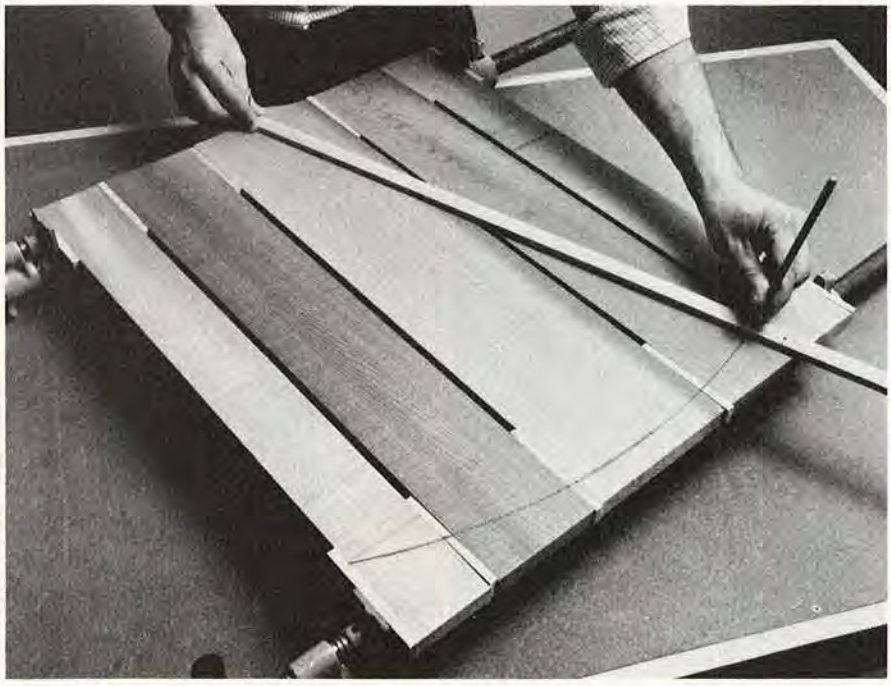
6 Remove the masking tape and trim the protruding ends of D flush with the legs. Sand all the joints and plugs smooth.

7 Bevel-rip the front edge of stretcher E at 30° and the top edge of each stretcher F at 10°. Then crosscut E and F to size.

8 Position and dry-clamp stretchers E and F between the chair sides. Prebore holes for the ¼"×3½" lag screws through the chair sides as shown in the Lag Screw Detail. (Before inserting the screws, we used a hacksaw to cut a slot in the head of each lag screw to ease insertion later with a screwdriver.) Mark the location of E and F on the side frame assemblies. Then remove the clamps and round-over all edges except where E and F come into contact with the side frames. Round-over the back edges of E and the bottom edges of F.

9 Tape the exposed end grain and epoxy and clamp the mating surfaces of E and F to the chair sides. Then use a wrench to turn the lag screws down as far as possible. (You'll need to finish driving the bolts with a screwdriver.) Cut ½" redwood plugs and epoxy them into position to conceal the screws.

10 After the glue has thoroughly dried, scrape off any excess and finish-sand the framework.

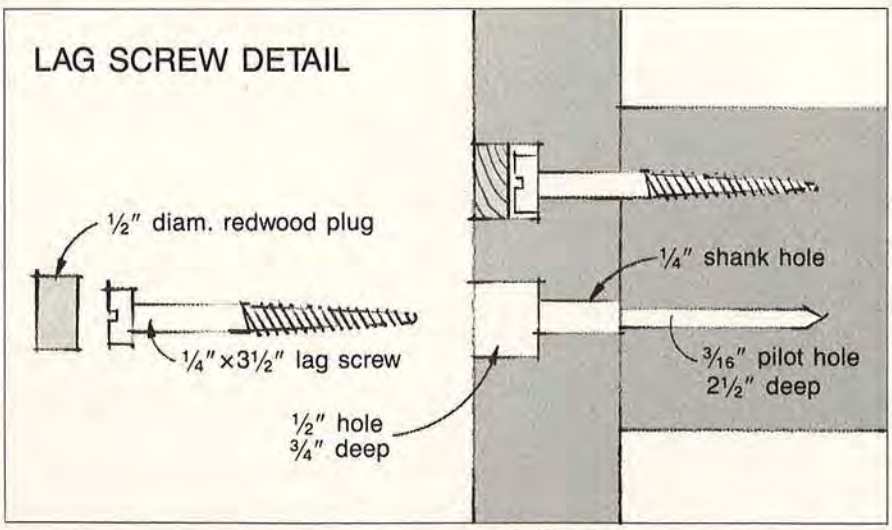


Mark the seat radius with a trammel of scrap wood

Assembling the seat and back

1 Bevel-rip one edge of the back cleats (G, H) to 30°, and one edge of each bottom cleat (I) at 10°, then crosscut the cleats to size. Cut the seat and back pieces (J, K, L, M, N, O) to size plus 1" in length. Mark the radii on the top of the backpieces and use a band saw or jigsaw to cut to shape. Sand out any saw marks.

2 Cut ¼"×¾"×4" scrap-wood pieces and insert them between the seat pieces (J, K, L) and backrest pieces (M, N, O). Dry-clamp the seat pieces and spacers, then mark the 25" radius on the seat assembly as shown in the photo above. (We made a trammel out of scrap stock, drove a nail in at one end and drilled a hole for the pencil lead 25" away at the other end. We then centered the nail at the back of the seat assembly and marked the radius at the other end.) Move the clamps so they don't interfere with the path of the saw blade, and cut the seat front to shape. By leaving the pieces clamped up, the spacers act as chip breakers when cutting and routing the front and back ends of the seat assembly and the bottom of the backrest.



3 Dry-clamp the backrest pieces and spacers. Using a ½" round-over bit, rout the ends of the seat assembly and the bottom end of the backrest. Remove the clamps and spacers and using a ¼" round-over bit, rout the top-side edges of the seat pieces and the sides and top of the backrest pieces. Finish-sand all the seat and backrest pieces.

4 Reclamp the seat pieces and spacers, then measure and mark the position of cleats (I) on the bottom of the seat assembly. Epoxy and screw the cleats to the seat parts using #8 × 1¼" wood screws, then remove the clamps and spacers.

5 Position the same ¼" scrap-wood spacers and backrest pieces facedown on a flat surface, dry-clamp, then epoxy and screw the bottom support (G) to the pieces. Now hold the partially assembled back in position on the chair and mark the location of the top support (H). Remove the back and seat assembly, then glue and screw H to the back pieces.

Finishing and final assembly

1 Check for any marks left when clamping and sand if necessary. Stain the chair framework, then apply several coats of clear exterior finish to it, lightly sanding with steel wool between coats. Apply primer to the seat and back assemblies, let them dry, and sand lightly. Apply several coats of exterior paint to the seat and back assemblies.

2 After the finishes have completely dried, fasten the seat and back assemblies to the framework.

THE CHAISE LOUNGE

Note: Read the preceding instructions thoroughly before beginning this project, since the construction and finishing techniques are very similar to those of the redwood chairs.

Constructing the framework

1 To build the redwood frame, start as you did in the chair construction by ripping ¼" off each edge of the 2 × 4 stock to remove the factory-rounded edges and end up a 3" finished width. Then, crosscut the legs (A), rails (B), stretchers (C, D) and support rails (E) to size.

2 Measure and mark the half-lap joint positions on A and B (see the End View Drawing for positioning) and cut the joints on scrap material. Adjust if necessary, then cut the redwood stock.

3 Tape the exposed end grain near the joints, then epoxy the mating surfaces and clamp the legs to the rails.

4 After the epoxy has thoroughly dried, prebore holes to accept #8 × ¾" screws and ⅜" plugs on the inside edges at the half-lap joints. Dip the screw threads in epoxy and drive the screws. Cut ⅜" redwood plugs, and epoxy them in place over the wood screws. After the epoxy has dried, remove the masking tape and sand the joints and plugs smooth.

5 Rout all edges and corners of the A–B assembly, using a ¼" round-over bit.

6 Cut the rabbets in the ends of the stretchers (D). Then, using the Side Section Drawing as reference, measure and mark the location of the notches and slots on the support rails (E), drill ¾" holes for the slots and make the necessary cuts. Test-fit pieces D and E together and adjust if necessary. When everything fits, epoxy and clamp D and E.

7 Epoxy and clamp the D, E assembly along with part C between the leg/rail assemblies (A, B) (see the Side Section Drawing for correct positioning). Prebore holes to accept #10 × 1½" screws, then fasten the inner framework (D, E) to the leg/rail assemblies with screws and epoxy. Prebore holes where C meets A, B to accept ¼" × 3½" lag screws and ½" plugs. Drive the screws, then cut and insert the ½" redwood plugs.

Constructing the backrest, seat, and legrest

1 Rip the backrest pieces (F, G, H) to size, then crosscut them to length plus 14" (the excess will be used to make the draped ends). Cut F, G, and H to size. Crosscut the 14" pieces in half, and draw the radius on each end to form pieces I, J, and K. Cut the ends of the pieces to shape and sand out all saw marks. Cut the largest pieces (L, M, N), and seat pieces (O, P, Q) to size.

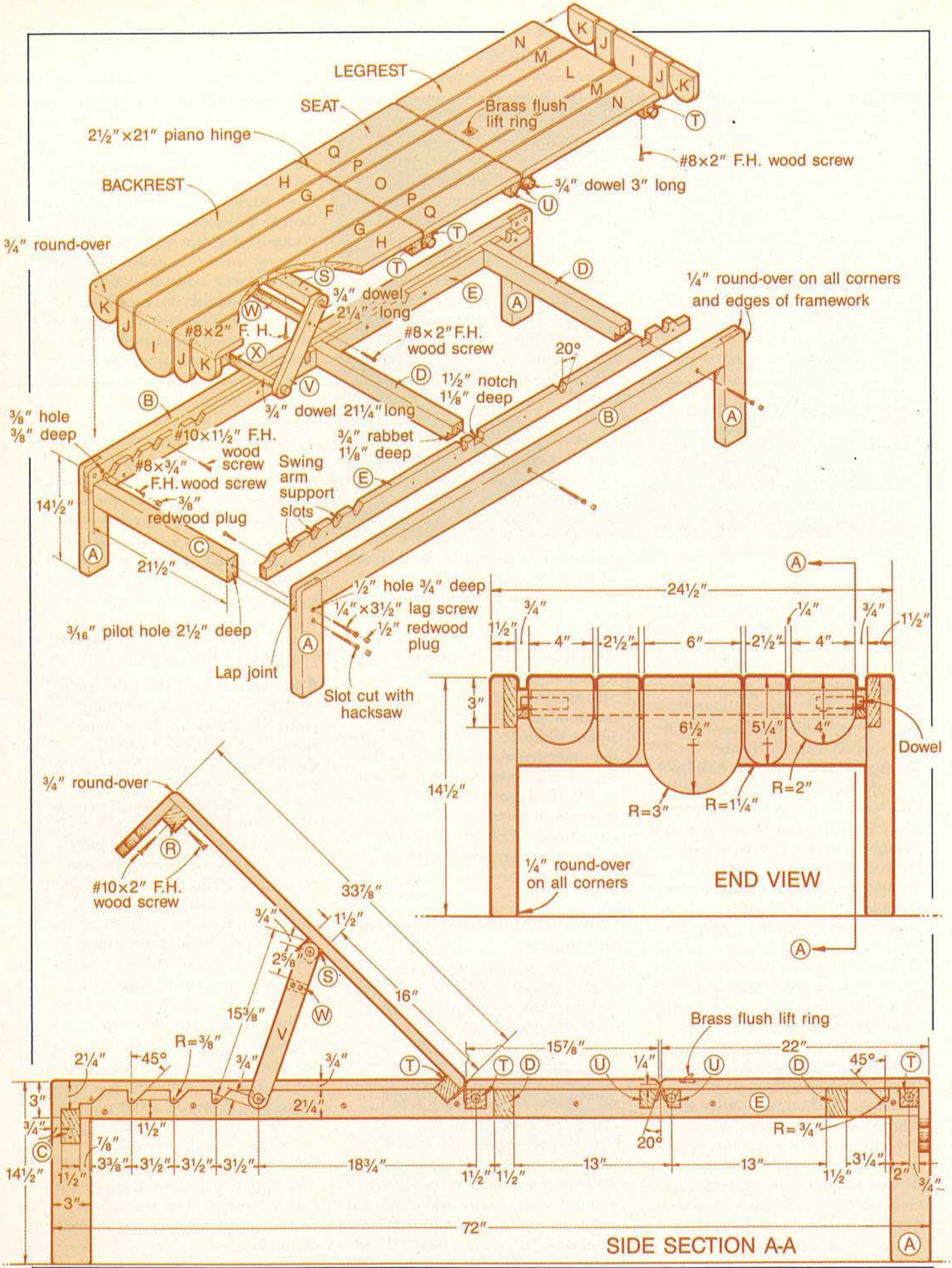
2 Being careful not to damage the rounded ends, epoxy and clamp I, J, and K to the backrest pieces (F, G, H) and to the leg rest pieces (L, M, N). (We used bar clamps and scrap spacer blocks to clamp the pieces together—again, taping the exposed end grain to prevent the epoxy squeeze-out from sealing the wood.)

3 Rout a round-over on all edges on the backrest, seat, and leg rest with a ¼" bit. Dry-clamp the pieces together, side by side, to prevent chipping, then rout or sand a ¾" round-over on the ends of F, G, H, L, M, N, O, P, and Q.

4 Rip and crosscut the cross members (R, S, T, U) and swing arm pieces (V, W, X) to size as dimensioned in the Bill of Materials. Center bore ¾" holes 2¼" deep in the ends of S, two of the T cross members, and one U cross member. (We clamped our pieces vertically in a vise and drilled the holes with a spade bit, taking extreme care to drill straight into the pieces.) Install ¾" dowels in S so they protrude ¾" and trim if necessary. Bevel-rip the 20° edge on both U cross members. Mark the ¾" radius on the ends of V and cut to shape, then drill ¾" holes in each end as shown in the Side Section Drawing.

5 Checking for square and keeping the ends flush, position the backrest pieces (F, G, H), with the spacers inserted face-down on a flat surface and dry-clamp them as shown in the how-to photo on page 60. Mark the positions of R, S, and T, then epoxy and screw them to the backrest pieces. Use the same procedure for the seat and footrest assemblies.

Continued


LEGREST
SEAT
2½"×21" piano hinge
BACKREST
Brass flush lift ring
#8×2" F.H. wood screw
¾" dowel 3" long
¾" round-over
¼" round-over on all corners and edges of framework
¾" dowel 2¼" long
#8×2" F. H.
#8×2" F.H. wood screw
20°
1½" notch 1⅛" deep
⅜" hole ⅜" deep
¾" dowel 21¼" long
#10×1½" F.H. wood screw
¾" rabbet 1⅛" deep
#8×¾" F.H. wood screw
Swing arm support slots
⅜" redwood plug
14½"
21½"
⅜6" pilot hole 2½" deep
½" hole ¾" deep
¼"×3½" lag screw
½" redwood plug
Lap joint
Slot cut with hacksaw
24½"
1½"
4"
2½"
6"
3"
6½"
5¼"
Dowel
R=3"
R=1¼"
R=2"
¼" round-over on all corners
END VIEW
#10×2" F.H. wood screw
33⅞"
2⅝"
16"
15⅜"
R=⅜"
2¼"
45°
Brass flush lift ring
15⅞"
22"
20°
R=¾"
3"
1½"
⅞"
3⅜"
3½"
18¾"
13"
3¼"
2"
72"
SIDE SECTION A-A

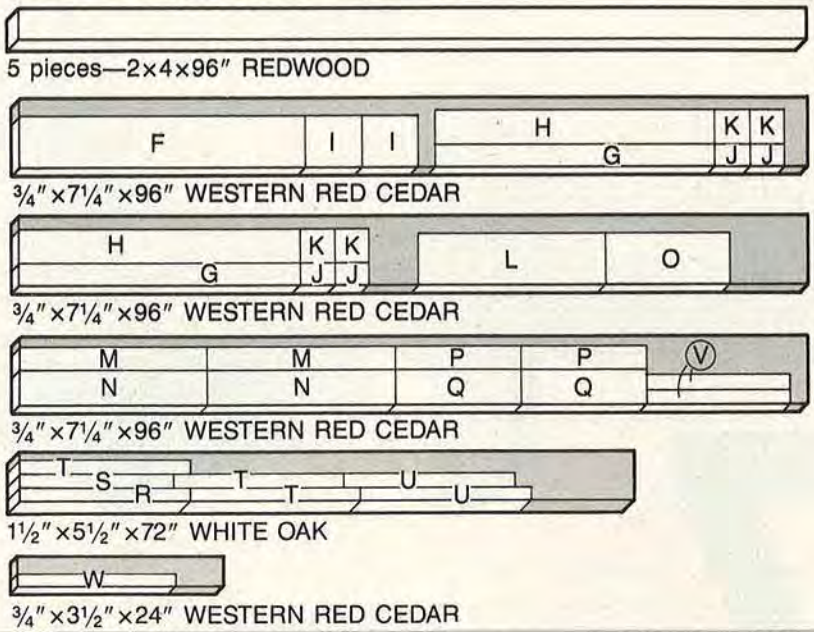
Bill of Materials

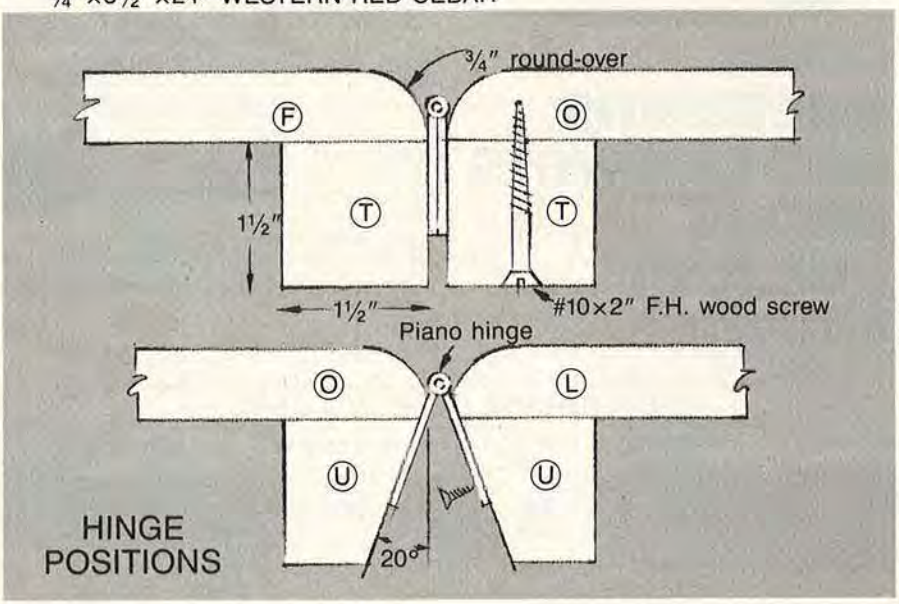
Part	Finished Size* T	W	L	Material	Qty.
Chaise Lounge					
A	1½"	3"	141/2"	redwood	4
B	1½"	3"	72"	redwood	2
C	1½"	2¾"	21½"	redwood	1
D	1½"	2¼"	21½"	redwood	2
E	¾"	2¼"	69"	redwood	2
F*	¾"	6"	337/8"	western red cedar	1
G*	¾"	2½"	337/8"	western red cedar	2
H*	¾"	4"	337/8"	western red cedar	2
I*	¾"	6"	53/4"	western red cedar	2
J*	¾"	2½"	4½"	western red cedar	4
K*	¾"	4"	3¼"	western red cedar	4
L	¾"	6"	22"	western red cedar	1
M	¾"	2½"	22"	western red cedar	2
N	¾"	4"	22"	western red cedar	2
O	¾"	6"	157/8"	western red cedar	1
P	¾"	2½"	157/8"	western red cedar	2
Q	¾"	4"	157/8"	western red cedar	2
R	1½"	1½"	193/4"	white oak	1
S	1½"	1½"	181/4"	white oak	1
T	1½"	1½"	193/4"	white oak	3
U	1½"	1½"	193/4"	white oak	2
V	¾"	1½"	153/8"	western red cedar	2
W	¾"	1½"	20"	western red cedar	1
X	¾" diam.		21¼"	oak dowel	1

*Some parts are cut larger initially then trimmed to finished size. Please read instructions before cutting.

Supplies: epoxy, 4—¼"×3½" lag screws, 4—½" redwood plugs, 14—#10×1½" flathead wood screws, 12—#8×¾" flathead wood screws, 12—⅜" redwood plugs, #8×2" flathead wood screws, 60—#10×2" flathead wood screws, ¾" white oak dowel, 2—2½"×21" continuous hinges, flathead wood screws to fit hinges, 2"×2½" brass flush lift ring (made by Amerock), white exterior enamel, redwood stain, clear-exterior finish

Chaise Lounge Cutting diagram





6 Trim one end of the footrest and one end of the seat section at 20°, as shown in drawing above.

7 Position the assemblies on the framework and check the fit. Attach the piano hinges to the three assemblies, as shown. Rout out a recess to accept the brass lift ring, then fasten it to the footrest with screws.

8 Fit the two backrest supports (V) onto the dowel protrusions on the ends of S. (We applied paraffin wax to the dowels protruding from S and to their mating hole in V for smooth operation.) Insert a ¾" dowel (X) at the lower end of each piece V. Using the Side Section Drawing as a guide, position, screw, and epoxy W between the supports.

Final assembly and finishing

1 Finish-sand the redwood framework and the completed assemblies. Stain the redwood framework, let it dry, and apply several coats of finish. Prime and paint the backrest, seat, and legrest assemblies.

2 Position the seat assembly on the framework (no permanent fasteners are used to attach the seat assembly to the framework). ■

7 basic questions and answers about outdoor finishes

Unless you like weathered gray—and certainly many folks do—outdoor furniture of redwood, cedar, or treated wood requires a finish. Here's how to choose one that will give your project the look—and protection—you want.

1. Redwood, cedar, and treated wood last and last. So why apply a finish?

An obvious answer is appearance, but there's a practical angle, too.

Redwood and cedar heartwood contain naturally occurring tannic compounds that fend off insects and resist decay. But since they're low in gum and resin and rather open grained, moisture raises the surface grain and eventually leads to checking and splintering. Mildew then attacks the dampness harbored in the wood.

Pine and hemlock pressure-treated with noncarcinogenic chromated copper arsonate (CCA) chemicals last as long as redwood and cedar. However, treated woods marketed under such brand names as *Wolmanized, Outdoor,* and *Osmose* still tend to check.

So it's wise to use a moisture-resistant finish.

2. What will outdoor wood look like if left unfinished?

Exposed to the elements, the cinnamon hues of clear all-heart redwood and the cozy brown of cedar turn varying shades of gray. First, though, their tannic compounds leach out somewhat and darken the wood. Depending on conditions, the weathering process can take up to several years.

Wood containing CCA comes with a cast approximating the light green of a dollar bill or, occasionally, an amber color. But treated wood also weathers in a year or two to a pleasing gray.

If you appreciate the weathered look (it's very popular on the West Coast), complete with natural checks and slight surface imperfections, leave your redwood, cedar, or treated wood furniture alone to do its thing.

3. Is it possible to preserve wood's natural color?

If you prefer the natural color of new redwood and cedar to weathered grain, you need a product that leaves a clear surface film on the wood. And that presents a problem.

OUTDOOR FURNITURE FINISHES AT A GLANCE

FINISH TYPE	APPEARANCE	APPLICATION	COATS	RENEW	COMMENTS
CLEAR: Spar varnish	gloss	brush, spray on	2-3	1-2 yrs.	surface darkens, peels; hard to remove
Polyurethane/plastic	gloss, semi-gloss	brush, spray on	2-3	1-2 yrs.	wood darkens, finish cracks; hard to remove
Water repellents	dull sheen	brush/roll on	1-2	2 yrs.	wood eventually darkens; light sanding before renewal
Penetrating oils	dull or flat	wipe on/off	1-2	6 mos.	wood weathers, appears dark; frequent renewal
Paste wax	low sheen	rub on/off	1-2	3-4 mos.	mostly as extra protection, frequent renewal
WEATHERING: Bleaching oils/stains	flat	brush/wipe on	1-2	1 yr.	wood weathers, ages
COLORED: Semitransparent stains	flat	brush/roll on	1	2 yrs.	grain, texture shows; color fades, wood weathers
Opaque stains	flat	brush/roll on	1	2 yrs.	pigments can blotch, wear off; hides wood features
Paint, (oil, acrylic, latex bases)	flat to high-gloss	brush, roll, spray on	2	2-3 yrs.	needs oil-based primer; can bubble, wear off

NOTE: This chart applies to outdoor furniture of redwood, cedar, and treated wood. Finishes may perform differently on vertical surfaces such as fences and siding than on horizontal surfaces. Consult a qualified dealer about your specific needs.

Clear film finishes protect wood from water while allowing the color to show through, but they admit ultraviolet sun rays. The wood cells react with these rays and begin to deteriorate, causing a minor commotion under the film. The wood darkens and the finish cracks, blisters, and peels.

Adding an ultraviolet (UV) filtering agent to the finish retards the reaction, but doesn't completely do away with it. If you plan to use a clear finish, be sure the one you select has UV absorbers (read the label). Even with UV protection, you'll have to renew the finish at least every two years. If you wait until it peels, you're faced with a tedious stripping job.

With treated wood, you probably won't want to preserve the green color—and that's exactly what happens if you apply a clear finish.

4. What types of clear finishes are there?

Many types of finishes are "clear," in that they carry no color additive, but each looks and performs differently.

• **Spar varnish,** a traditional film treatment, is no doubt the best known product of this type. Others are sold as specially formulated *plastic* or *polyurethane* finishes. Beware of the two-part "mix A and B" polyester coatings when working with redwood and cedar—due to natural extractives in the wood, they won't readily adhere.

• **Oil finishes,** although they do darken the wood noticeably, can also be classified as clear. Because oil finishes penetrate the grain and seal it against the elements rather than create a surface film, they'll never crack, blister, or peel. But they do require touching up every six months or so.

• **Water repellents** are another option. Mixtures of oil and surface film, they penetrate the wood and protect it from moisture damage and mildew. Similar to a surface film, water repellents leave a coating on top of the wood, but most manufacturers add the necessary UV absorbers. You can expect these finishes to last up to two years before they begin to deteriorate and the wood weathers. Then they'll require light sanding before renewal.

• **Paste waxes** usually add only extra protection and sheen to a finish, though at least one manufacturer says two or three coats, rubbed on and renewed, are all that's needed on new wood.

5. Are there differences between opaque and semi-transparent stains?

The breathing ability of pigmented outdoor penetrating stains means the finish won't crack or peel from trapped air, moisture, or possible wood movement. The result is a long-lasting finish with exactly the color tone you want and minimal maintenance.

• **Semitransparent** stains, with their light pigmentation, let the natural grain and wood texture show through. Such stains are available in colors that very closely match various woods. Brighter colors can either contrast or complement your house, deck, or patio. These stains usually have an oil base.

• **Opaque stains** resemble paint in that they conceal the grain, yet they allow the wood texture to show. They're available in a variety of natural-looking colors and brighter hues, and in both oil and latex base.

Since the pigment in this type of stain is suspended in an oil or latex carrier, it's possible that all wood surfaces won't be equally penetrated. On horizontal surfaces especially, pigment that doesn't completely penetrate may collect, causing blotchy areas that wear off or blister. Also, the California Redwood Association doesn't recommend using stains with a latex base on redwood projects.

Treated lumber, with its greenish hue, requires that you select a compatible stain color, since the green tends to alter the final appearance.

6. When should you use paint?

Paint isn't often used on the top grades of redwood or cedar because it completely hides grain, texture, and color. But it can be your solution to coping with the hue of treated wood.

If you decide to use paint on your outdoor furniture project, no matter what wood you've selected, be sure to apply an oil or alkyd base primer, then sand lightly before finishing, for better adhesion.

You can expect painted furniture's horizontal surfaces to undergo much more wear and tear than vertical surfaces such as house siding, so avoid the need for early renewal or removal by selecting the highest quality paint available.

7. Does redwood, cedar, or treated wood require special pre-finish preparation?

First, any wood has to be clean and dry. Scrub dirty wood with nonammoniated laundry detergent and water, rinse, then let it dry in the sun for a few days.

Sometimes redwood and cedar develop dark discolorations from either mildew or tannic acid, especially if the wood has been outside for awhile. In these cases, scrub affected surfaces with a solution of one cup nonammoniated laundry detergent and one quart of household bleach to three quarts water. Rinse with fresh water, then apply a 50/50 solution of bleach and water. Rinse again and let the wood dry completely. (Be sure to wear rubber gloves and eye protection throughout the process.) To prevent future mildew problems, select a finish containing a mildewcide or use an anti-mildew additive.

To renew severely weathered redwood and cedar, brush away loose wood fibers with a stiff brush, then clean with a mixture of four ounces (dry weight) oxalic acid in a gallon of water. Flush the wood thoroughly with clean water and allow it to dry for several days before finishing.

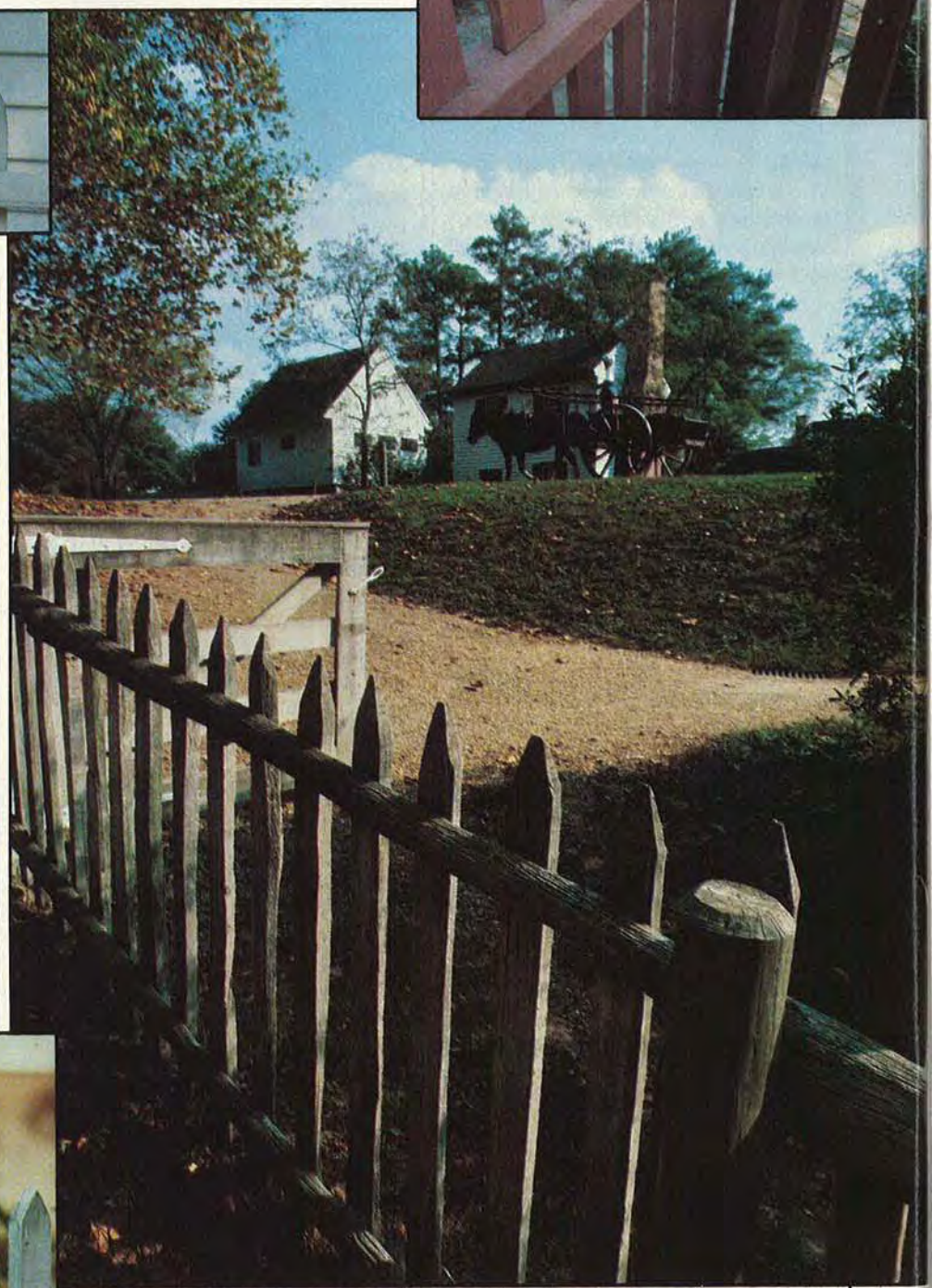
New treated lumber should be "aged" for 30–60 days before finishing to give the wood time to shed any excess moisture. ■

COLONIAL WILLIAMSBURG FENCES

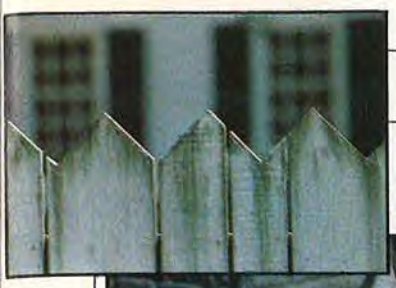
Styles to adopt, adapt, admire

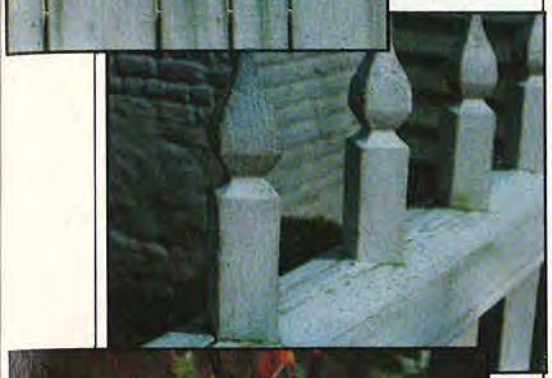
Looking for that "just right" fence for your home? Whether you live in a spacious colonial, a quaint Cape Cod, a classic Victorian, or a contemporary split-level, you may want to try your hand at building one of the many designs that enhance the streets of Virginia's Colonial Williamsburg.

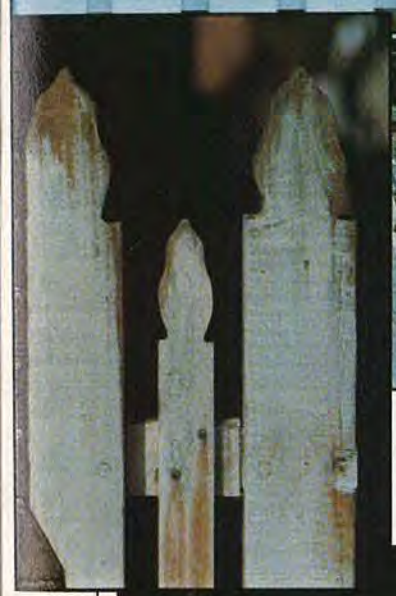
Photographs: Thom Slater

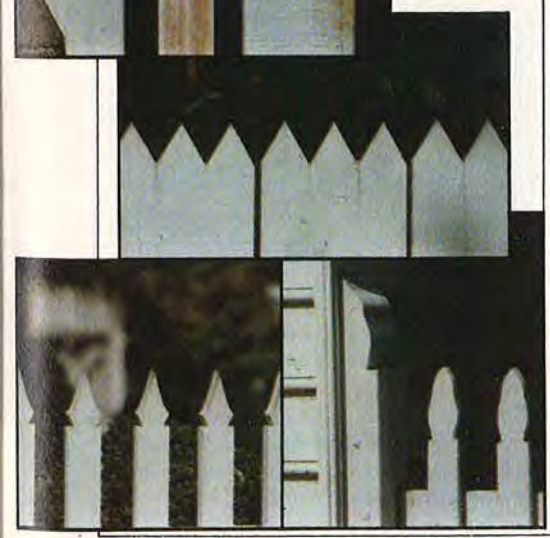


Developed with assistance from Vanessa E. Patrick and other members of the Colonial Williamsburg Foundation staff.









Fences in Williamsburg, the pre-Revolutionary War capital of the Virginia Colony, were built not only because of English agricultural tradition, but because they were the law. According to the House of Burgesses' "Fence Law" of 1705, ". . . every person having any lots or half-acres of land contiguous to the great street shall in close [sic] the said lots, or half-acres with a wall, pails, or post and rails, within six months after building. . . ."

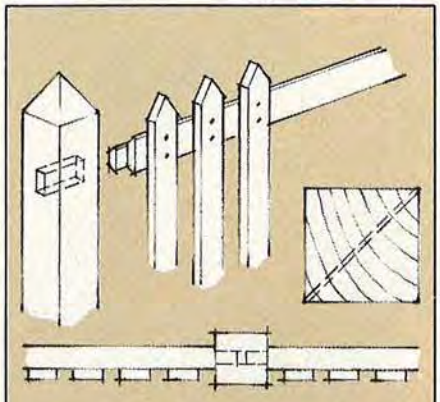
Today, the original section of the town restored by the Colonial Williamsburg Foundation displays the happy result of that early law. The streets, gardens, and yards of this once-aristocratic city boast fences of many colors, shapes, styles, and purposes.

Some fences were meant to conceal—around stables, garbage, and wash areas, for example. Others marked property lines. Interior fences blocked off kitchen gardens, fruit trees, flower gardens, and walkways. Fences painstakingly built to the same design provided "a feeling of unity and common ownership," reported one early resident. A few property owners, intending only to follow the law, let simplicity be their guide and put up the barest essentials.

The Williamsburg paled fence

What we today call "pickets," the townsfolk of Williamsburg termed *pales*. A paled fence consisted of hewn or sawn posts 6″ square and 7′ long, pointed at one end and tarred for 2′ at the other; triangular rails 9′ long split from square stock; and sawn or riven pales 3″ to 4″ wide, 5′ long, and ¾″ thick, smoothed with a drawknife or hand-planed, with pointed tops.

Setting the fence went like this (see illustration): Posts, tarred end down, were set 2′ into the ground about 8′ apart. The rails, their widest side of 5″ to 6″ facing the front of the fence, were mortised-and-tenoned into the posts at a slight recess so that the pales, when attached, would be flush with the posts. Pales, which were spaced evenly and tight enough to keep livestock or poultry out (or in), then were fastened to the rails with 10d nails.



The rail of a paled fence was split from a 4 × 4 post. Its triangular shape shed water. Mortises for the rail were cut so the pales would be flush when attached.

Our photographs show the many varieties of this simple fence. Apparently, individuality came into play as much then as it does now. As long as the fence conformed to the law's required 4½′ to 5′ height, the manner of construction was left to the builder. From historical records, we know that Williamsburg residents were fussier about what type of wood went into the fence than they were about its appearance.

The colonists had far more wood for their fences in Virginia than in England, so they turned to the virgin forests for their materials. Posts were made of locust, cedar, oak, and often chestnut. Oak, poplar, and pine were hewn for rails. And pales were cut from pine, and to a lesser degree, poplar and chestnut.

Continued

Fence styles pictured above, top to bottom: flat-topped poultry; extra security lattice poultry; ornately intricate Chinese; worm; staked worm without rider; post-and-rail border.

Alternate Williamsburg styles

In addition to the extensively used paled fence with its ordinary notched, pointed, or Gothic top treatments, other fence styles also help to distinguish Williamsburg.

The Chinese style— a combination of grace and geometry— embellishes prominent homes, for only the wealthy could afford the skilled labor required.

Post-and-rail fences on the town's perimeter appeal to both the eye and practicality. Using much less material than the paled fences of the central city, these panoramic fences often bordered major roads entering and leaving Williamsburg.

The seemingly endless, undulating lines of the "worm" fence, now seen only around Williamsburg's powder magazine and parade ground, once crawled over the surrounding countryside. These rugged, rough-hewn fences consisted of split rails 8′ to 10′ long, stacked atop one another at angles rather than attached to posts. While other Williamsburg fences have European origins, the squiggly worm is strictly an American creation.

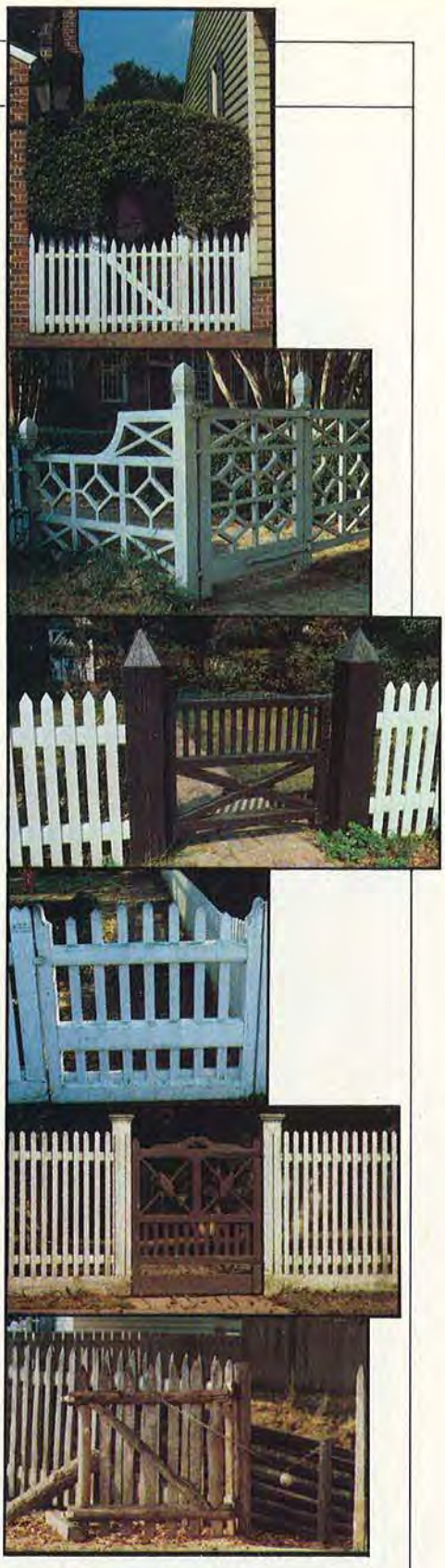
Riders improved the worm fence's stability. Crossed pole stakes, set at an angle into the ground, were used alone or with a heavy log (the rider) atop the rail juncture to add support.

Since the backyards of Colonial Williamsburg often hosted chickens, a more secure interwoven fence evolved that better suited confinement. In construction, the poultry fence is actually a plain paled type latticed with horizontal laths.

"Plaine and convenient" gates

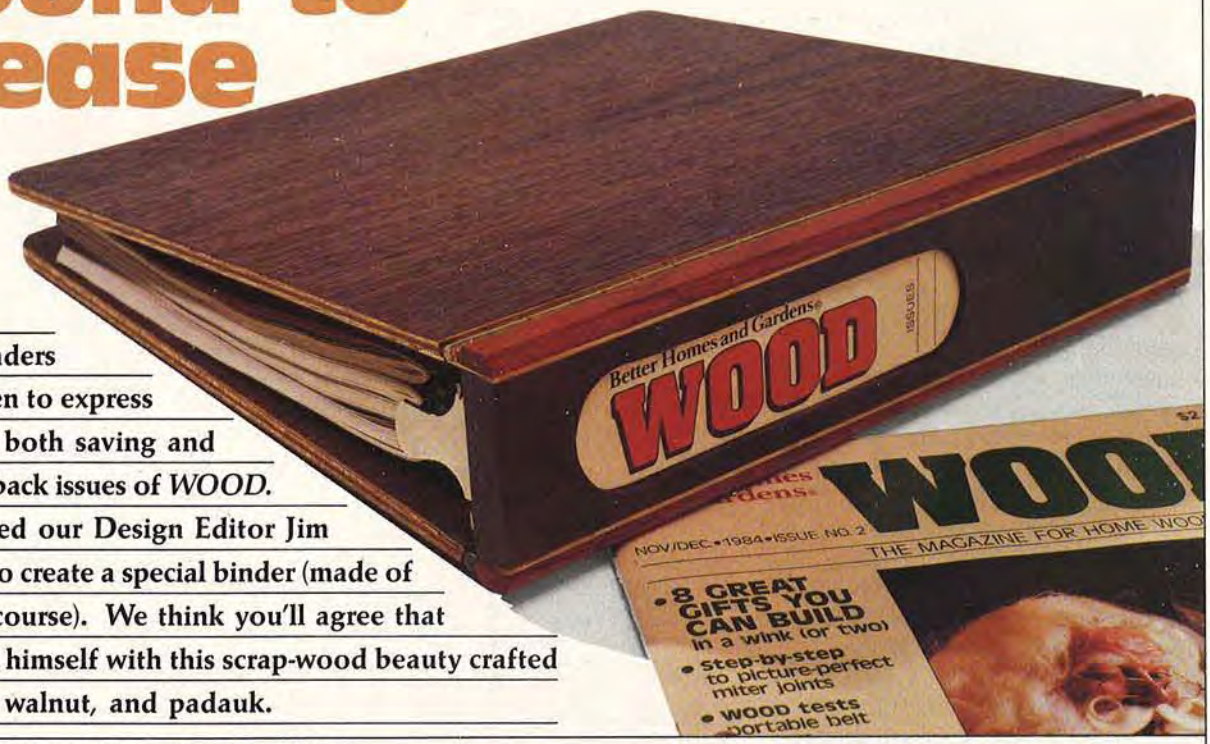
Just as fences were required by the 1705 law, gates became the subject of legislation, too. Property owners had to place a gate in their fence at a "plaine and convenient" point.

Unlike fences, gates followed no predictable pattern. The only similarity between them is the way they close. A cast-iron ball sliding on a length of chain that's connected to the gate and to a short post set a few feet behind serves as the self-closing device. ■



Pictured above, top to bottom: arbor gate decorating an alley entrance; Chinese fence corner gate; gate enhanced by massive posts; gate with mortised pales; decorative main gate; rough-hewn cedar paled gate showing common closing device with sliding iron ball.

WOOD MAGAZINE bound to please


Better Homes and Gardens
WOOD
ISSUES
NOV/DEC • 1984 • ISSUE NO. 2
THE MAGAZINE FOR HOME WOO
• 8 GREAT GIFTS YOU CAN BUILD in a wink (or two)
• step-by-step to picture-perfect miter joints
• WOOD tests portable belt

Lots of readers have written to express interest in both saving and obtaining back issues of *WOOD*. So we asked our Design Editor Jim Downing to create a special binder (made of wood, of course). We think you'll agree that Jim outdid himself with this scrap-wood beauty crafted from oak, walnut, and padauk.

Photograph: Hopkins Associates Illustrations: Bill Zaun

We even had our printer run a supply of customized *WOOD* labels especially for this project. See the "Editor's Angle" on page 6 for how to order your label—they're on us! (Instructions for the three-ring-binder jig used to drill holes in the magazine appeared on page 67 of the April, 1985 issue.) Each binder keeps approximately a year's issues at your fingertips.

Note: You'll need some thin stock to complete this project. You can either resaw or plane thicker stock to size, or special-order. We ordered ours from the Craftsman Wood Service Company.

1 Cut the two pieces of ¼" walnut plywood to 9¾"×11½" for the cover leaves (A). (We scribed the cut lines first, then placed masking tape over them, and cut them with a sharp blade to minimize chipping.) Mark the radiused corners and cut to shape.

2 Cut ⅜" rabbets 1/16" deep along the inside edge of each cover leaf. (We cut the rabbets on our router table to the same depth—1/16"—as the thickness of the hinge it will house. We also cut the rabbet on the face with the most chips so the best face would show.)

3 Using ½" stock, rip the spine (B) to 2" and crosscut it to 12½".

4 Make the label recessing jig as shown in the sketch on next page. Then fit the jig over the walnut spine and clamp the assembly to your workbench. Using a ½" straight bit and a ⅝" guide bushing, cut the ⅛" recess.

5 Using ⅛" oak stock, rip two strips (C) to ½", then crosscut them to 12½". Glue and clamp the strips to both edges of the walnut spine.

6 After the glue has thoroughly dried, saw each edge so only a 1/16"-thick strip of oak remains, as shown in the drawing. Now, cut two ⅜" rabbets 1/16" deep in the spine, as shown in the exploded-view drawing. (We used a router table fitted with a straight bit to make the cuts and tested on scrap material first.)

7 Using ¼" padauk stock, rip the corner pieces (D) to ½" and crosscut them to 12½". Glue and clamp the

Continued

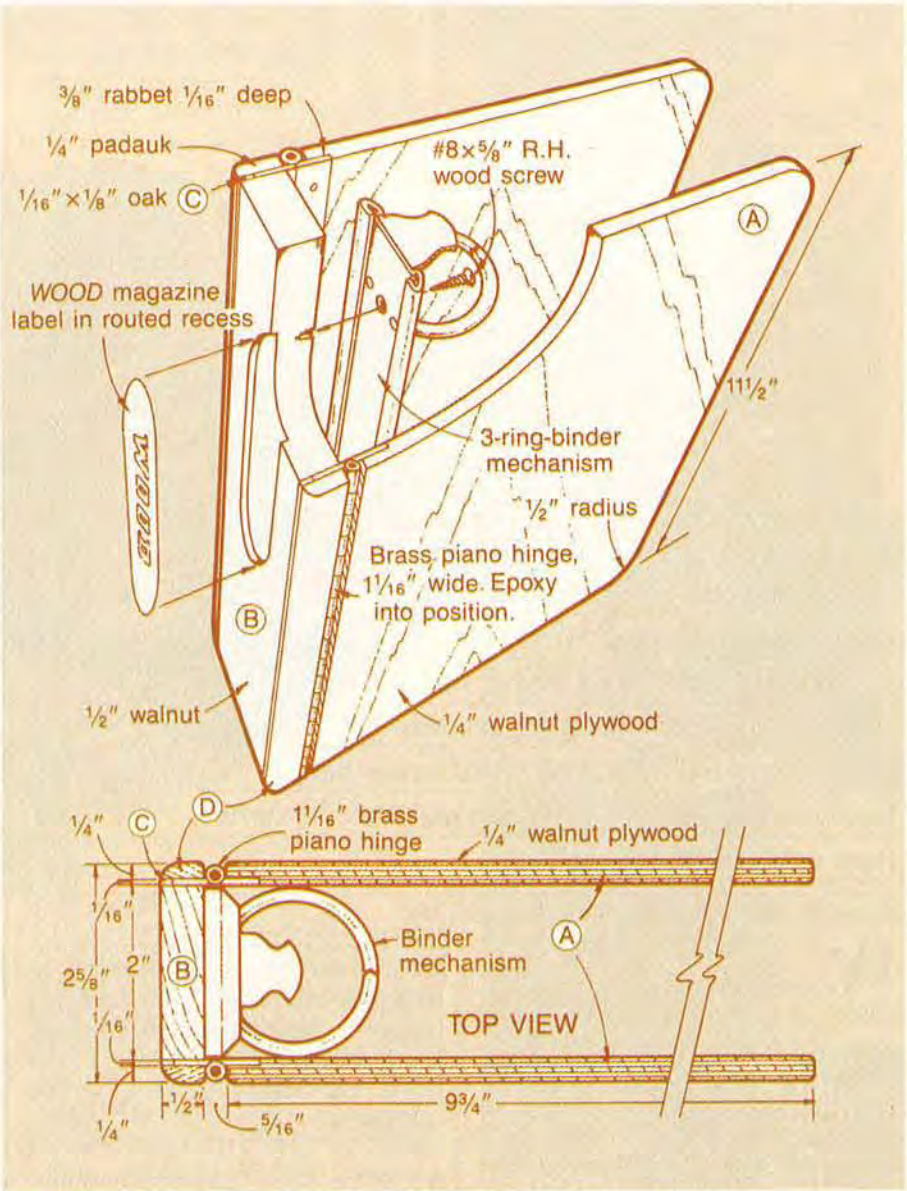
pieces to the oak and walnut spine assembly, using shims to prevent the hinge groove from collapsing. (To make sure the piano hinges fit, we used the thin shims to scrape away any epoxy squeeze-out in the hinge grooves.) When dry, trim both ends of the spine assembly to 11½".

8 Sand the faces of the spine flush, then rout or hand-sand a ¼" roundover along its outside edges.

9 Using a hacksaw, cut two pieces of piano hinge to 11½". For better adhesion, grind the surface of the hinges that will be coated with epoxy. Cover the wood around the rabbet in the cover leaves and around the slot in the spine with masking tape. This will protect the bare wood from epoxy squeeze out (it leaves unsightly stains after finishing). Now epoxy the hinges to the cover leaves and when dry, epoxy the hinges to the spine.

10 Remove the masking tape and any excess epoxy, finish-sand all surfaces and edges, and apply finish. (We rubbed on Minwax Paste Finishing Wax.)

11 After the finish has dried, install the three-ring binder mechanism using #8×⅝" wood screws. Glue the *WOOD* magazine label in the recess and install your past issues. ■

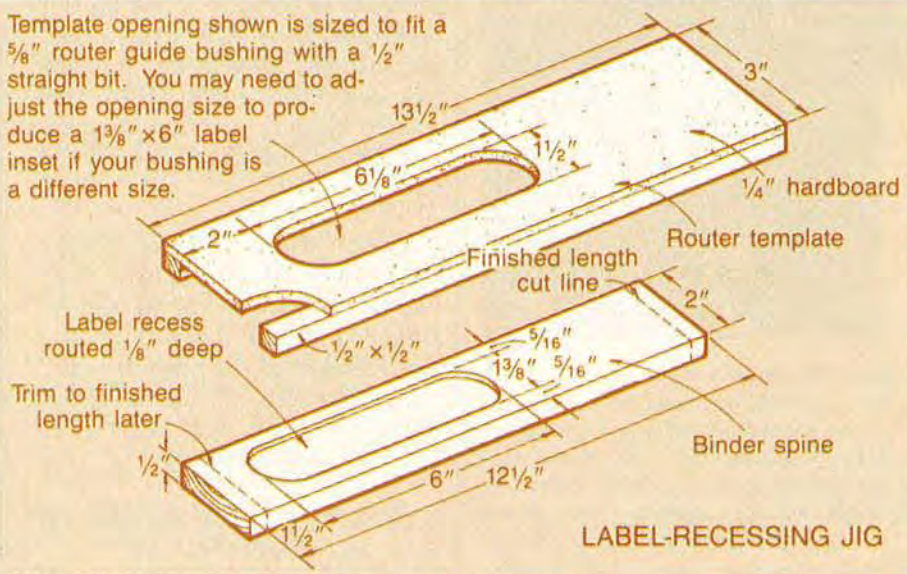


Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
A	¼"	9¾"	11½"	walnut plywood	2
B*	½"	2"	11½"	walnut	1
C*	1/16"	⅛"	11½"	oak	2
D*	¼"	½"	11½"	padauk	2

*Parts are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

Supplies: epoxy, 24" of 1 1/16"-wide brass piano hinge, 1 three-ring-binder mechanism (we bought a standard binder and removed the mechanism), 2—#8×⅝" roundhead wood screws, paste wax or polyurethane for finishing



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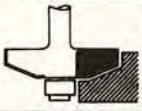
	#02	3/8" R	3/8"	1¼"	9/16"	14.00
	#03	1/2" R	1/2"	1½"	5/8"	15.00
		ROUND OVER				
	#04	1/4" R	1/4"	1"	1/2"	15.00
	#05	3/8" R	3/8"	1¼"	5/8"	16.00
	#06	1/2" R	1/2"	1½"	3/4"	19.00
		ROMAN OGEE				
	#07	5/32" R	5/32"	1¼"	15/32"	18.00
	#08	1/4" R	1/4"	1½"	3/4"	20.00
	#11	3/8" RABBETING	Deep 3/8"	1¼"	1/2"	14.00
	#09	1/8" (KERF) SLOT CUTTER		1¼"	1/8"	14.00
	#10	1/4" (KERF) SLOT CUTTER		1¼"	1/4"	14.00
	#12	45° CHAMFER	45° Angle	1½"	5/8"	15.00
	#15	RAISED PANEL	20° Angle	1-5/8"	1/2"	25.00
		DOVETAIL BITS				
	#16	3/8" DOVETAIL	9°	3/8"	3/8"	7.50
	#17	1/2" DOVETAIL	14°	1/2"	1/2"	8.50
	#18	3/4" DOVETAIL	14°	3/4"	7/8"	10.50
		CORE BOX (ROUND NOSE)				
	#19	3/8" CORE BOX	3/16"	3/8"	3/8"	11.00
	#20	1/2" CORE BOX	1/4"	1/2"	11/32"	14.00
	#21	3/4" CORE BOX	3/8"	3/4"	5/8"	18.00
		GROOVE FORMING OGEE				
	#22	1/2" GROOVING OGEE		1/2"	3/8"	16.50
	#23	3/4" GROOVING OGEE		3/4"	7/16"	21.00
	#24	1/4" Straight Bit		1/4"	1"	7.00
	#25	5/16" Straight Bit		5/16"	1"	7.00
	#26	3/8" Straight Bit		3/8"	1"	7.00
	#27	1/2" Straight Bit		1/2"	1"	7.00
	#28	3/4" Straight Bit		3/4"	1"	10.50
Flush Trim Key Hole	#13	1/2" FLUSH TRIM		1/2"	1"	8.50
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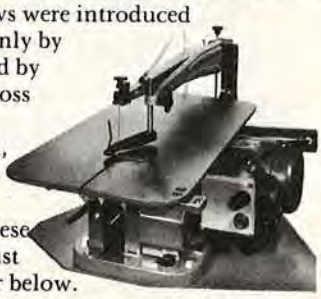

When HEGNER Scroll Saws were introduced six years ago, they were sold only by AMI, Ltd. Today, they are sold by approximately 100 dealers across the U.S., including the most respected houses in the nation, many of which used to sell other brands exclusively.

If you want to know why these dealers now sell HEGNER, just ask them. Their names appear below.

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C. B. Tool & Supply Co. Fresno, California
The Cutting Edge, Inc. Los Angeles, California
Peninsula Power Tool Monterey, California
Wood & Tool Center Mt. View, California
Sacramento Machinery N. Highland, California
John King Co. Pasadena, California
Orange Tool Mart Orange, California
C. B. Tool & Supply Co. Sacramento, California
Cutting Edge of San Diego San Diego, California
LS Tool Supply San Gabriel, California
C. B. Tool & Supply Co. San Jose, California
Schlosser Tool & Machinery Denver, Colorado
Englewood Hardware Englewood, Colorado
Craftsmanship in Wood Glastonbury, Connecticut
W.S. Jenks Washington, D.C.
Rudolf Bass, Inc. Hialeah, Florida
Highland Hardware Atlanta, Georgia
C. W. Crossen Davenport, Iowa
Puckett Electric Tool Des Moines, Iowa
The Hardwood Connection Dekalb, Illinois
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Tucker's Hardware Kansas City, Kansas
The Xylophile's Co. Lexington, Kentucky
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BOOKS WORTH READING

Working with Wood and *Advanced Woodworking*

By the editors, Time-Life Books, 541 North Fairbanks Court, Chicago, IL 60611. ©1979 and 1981, respectively.

136 pages each
$11.95 each, hardcover

This handsome pair of books introduces you to wood and the basic hand and power tools for working it. Then the editors give an overview of developing skills in joinery, wood turning, and working with veneers and inlays—all with excellent illustrations and diagrams.

Working with Wood starts with a useful section on how to distinguish quality boards from inferior ones, how lumber is milled and measured and what the grades mean. It also shows the most common warps that occur in wood and how to store lumber properly. A handy reference table matches material to projects.

This introductory book also explains the basic skills used with a handsaw, circular saw, and with a radial arm saw, including cutting panels. Other sections cover cutting curved edges, sharpening, boring holes, and shaping wood with a plane, drawknife, or spokeshave.

Advanced Woodworking discusses the characteristics of wood as a material, the flaws in a log that can affect lumber quality, and how various milling techniques turn out boards of different grain types. It teaches you techniques for using a table saw, a band saw, power planer, router, and lathe. Several sections demonstrate dados, rabbets, and other joints.

Together, these small books offer you a valuable peek into the skills and rewards of woodworking.

From *Working with Wood:* **"There are tricks to every basic operation—from the seemingly simple chores of driving a nail and planing a square, straight edge to the complications of scribing an elaborate curve and joining fancy moldings—the mastery of those tricks distinguishes a good carpenter . . ."**

From *Advanced Woodworking:* **"The interlocking parts of a dovetail joint are a triumph of the woodworker's art. Often used for decorative effect at the corners of boxes or cabinets, dovetails are equally useful hidden away on the sides of drawers since they are among the strongest corner joints."**

Continued from page 39

WOOD tests jigsaws

Cable blades. The blade stays mounted securely, eliminating the need for a blade-guide roller. The saw performs well on straight cuts and long curves. However, using the blade provided, we encountered difficulty with the tight, ¾"-radius curves in our test pattern.

Ryobi model JSE-60. *Japan. Orbital. Electronic. On/off trigger with lock. Blade and bevel base lock with Phillips screw. $186.00.*

This is an excellent jigsaw value. It cuts well, almost effortlessly, and with little chatter. The saw also cut our pattern faster than any other saw we tested. The results are smooth, with insignificant skew in the tightest curves. There is little vibration and noise, and the separate speed control is easy to manipulate while the saw is moving. The only difficulty was a slight tendency for the blade to loosen. It seemed difficult to tighten the Phillips screw adequately.

Sears model 17205. *U.S.A. Auto scroll. Nonorbital. Conventional variable-speed switch with lock. No speed-stop adjustment. Phillips screw for setting bevel and flat-blade screw for blade lock. $79.99.*

We like the size and power of this saw. The blade tends to skew on curves, though, which affects the quality of the cut. The auto scroll performs on longer curves, but there are some problems keeping

the blade on the line in the locked position. As with other auto scroll saws, the offset blade isn't always easy to see, making it more difficult to follow the cutting line.

Skil commercial model 500. *U.S.A. Auto scroll. Nonorbital. Conventional variable-speed trigger switch. Flat-blade screw for blade lock and Phillips for the bevel base. $90.00.*

This saw performs well and is well made for the price, but there's a potential drawback because it's somewhat bulky. The cut is mostly vertical and straight with a slight skew on tight corners and the handle feels comfortable. The auto scroll feature works satisfactorily, but for best control, you have to hold onto the top knob as well, and that requires you to clamp the work to a bench (this is true of all the auto scroll saws we tested). The variable-speed switch, like the others we tested, is tiring for the trigger finger to maintain pressure for a long period of use, but the switch lock is easy to use. ■

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In woodworking, no one knows it all. But through experience, we all discover better, safer, faster, or easier ways to do things. When we devise interesting tips or techniques, we'll share them with you in this column. And when you send us your favorites, we'll pay you $25 for each submission we publish. No shop tips can be returned. Mail your tips to:

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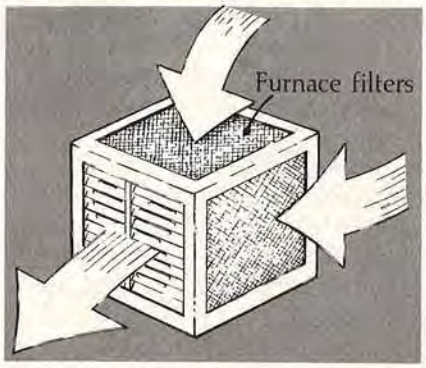
Des Moines, IA 50336

Workshop dust trap

Many power tool jobs produce a haze of powdery sawdust that drifts and settles everywhere. It's particularly irritating in your basement or garage.

TIP: Build a dust collector from a large cardboard box (or use plywood), then fit it with replaceable furnace filters on three or four sides and a room fan that expels filtered air from one side. Operate the fan near the source of dust.

—David L. Wisely, Waters, Mich.



Sprucing up metal tops

The top of your table saw looks forlorn—blemished by minor stains, rust, or corrosion on its metal surface. Or your jointer beds are grimy and coated with crud.

TIP: Brighten their appearance by spraying with rust remover or WD-40, then scouring with #3 steel wool pads on a pad sander (orbital action works best). Surfaces will shine like new after a few minutes' work. But don't saturate the sanders' felt pad.

Continued on page 76

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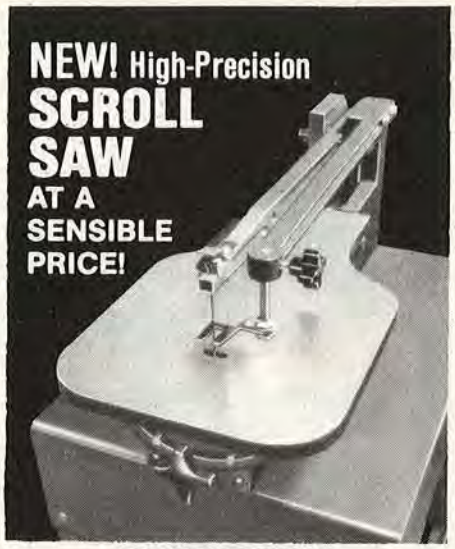

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 74

Slick care for clamps

Even tidy woodworkers get dried-on globs of glue on their pipe and bar clamps from squeeze-out and smearing.

TIP: Clean up your clamps and rub a thick layer of paraffin or paste wax over all parts. After that, the dried glue deposits will peel or chip off easily.

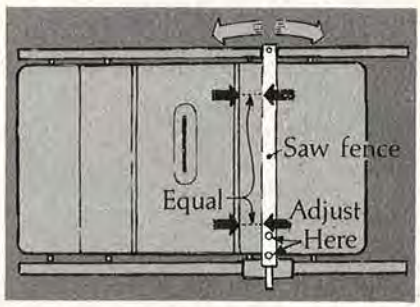
—Glenn Miller, Morristown, Minn.

Parallel check for rip fence

Even with normal, careful use, table saw ripping guides, meant to be parallel with the saw blade, become misaligned. As a result, sawn pieces don't fit perfectly because they contain practically undetectable tapers.

TIP: Routinely check alignment by setting the guide a few inches from the saw blade and tightening or locking it in place. Measure the distances to the nearest miter gauge slot, both at the front and back of the table. If the fence is out of adjustment, reset until distances are equal, front and back.

Be sure to do the following maintenance chore periodically too: Loosen the screws that connect the beam of the ripping guide to its front end. Lay the beam so one edge lies exactly along one side of a miter gauge slot and snug the guide in place. Now tighten the screws.



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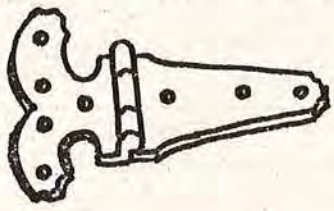

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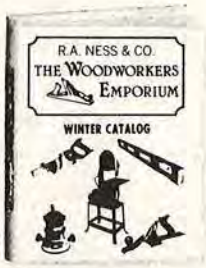

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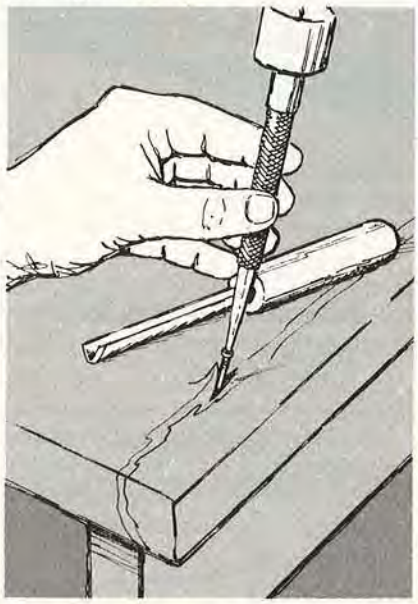
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 76

Out-of-sight nailing

Sometimes a filled nail hole stands out worse than a moose in a phone booth.

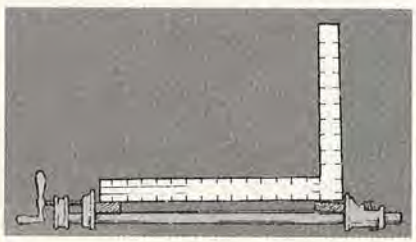
TIP: Hide that nail by using a sharp, narrow chisel or gouge to lift and turn back a small shallow flap of wood with the grain. Experiment on a piece of scrap of the same material first. Drive the nail inside the resulting cavity and set it. Glue and clamp the lifted section in its original position.



How to prevent twisted frames

Having the frame of a cabinet door turn out twisted after gluing can be a real disappointment.

TIP: Before gluing and clamping, fit the frame members together and lay a straightedge across adjoining members to make sure all surfaces are in the same plane. If they aren't, make sure cuts are square and splines are the same thickness. Add a perpendicular clamp if necessary, then recheck with the straightedge.



Continued on page 80

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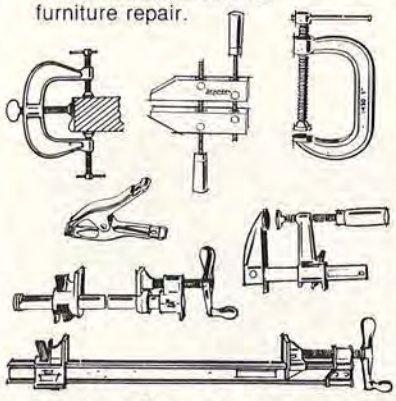

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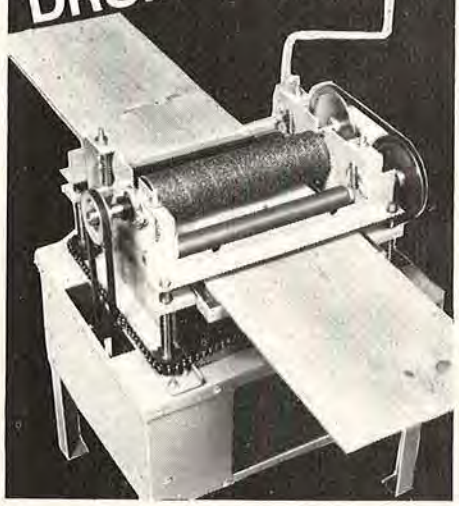

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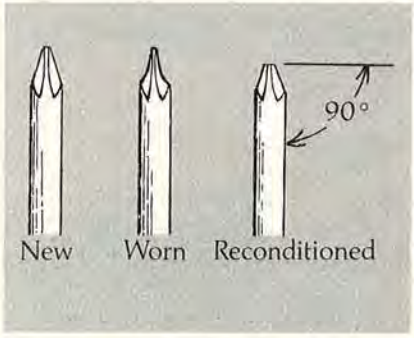
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 78

Tune up your Phillips

With use, the tips of Phillips screwdrivers wear down so the fin-like blades become ragged and hard to keep seated. One of these tools in disrepair may pop out of the slots and disfigure the screw-head or the surrounding wood.

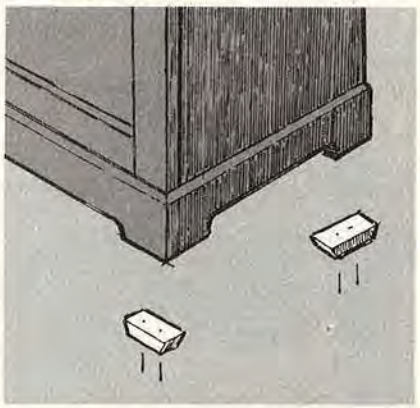
TIP: Recondition the screwdriver by carefully filing or grinding off the tip with a flat file and touching up the blades with a three-corner file so the whole tip seats snugly into screwheads. As you work, check the fit with a Phillips screw.



Temporary protection glide

Edges of wooden legs and supporting panels that rest on the floor—particularly those of plywood—may splinter when moved.

TIP: Protect these damage-prone parts by making gliders from smooth hardwood scrap and fastening them to the bottom of the piece with one or two finishing nails, as illustrated. Be sure to countersink the nails at least ⅛" so the heads won't mar flooring. When the project is complete, simply remove the protectors.



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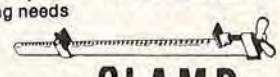

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TIPS FROM YOUR SHOP (AND OURS)

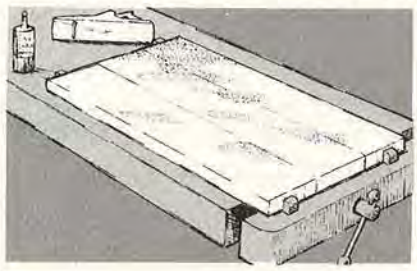
Continued from page 80

Pinpointing low spots

When hand-planing the surface of a glued-up piece you often miss minor high or low spots—even when you use a straightedge to determine whether the surface is all in the same plane. You may not notice these defects until after staining or other finishing. Then, suddenly, they jump out at you.

TIP: Rub a small amount of colored line chalk on the project surface, then plane it diagonally with very shallow cuts. The chalk stays on the wood depressions as you shave it off, leaving low spots clearly visible. Shading the surface of the wood with a soft lead pencil will do the job, too.

—Robert J. Stehm, Merchantville, N.J.

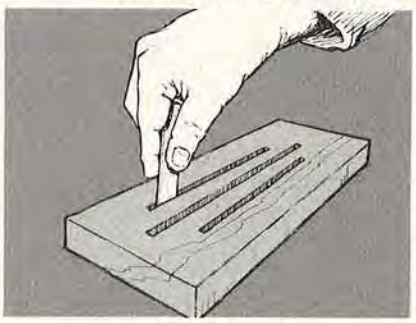


Sanding inside narrow slots

How do you sand the sides of a cut that's, say, only ⅛" wide? Conventional sanding blocks won't work. Sandpaper alone wears down the ends but hardly smoothes the middle section.

TIP: An emery board for manicuring fingernails can reach right into those "impossible" places for quick sanding. You also can get the same results by ripping thin wood pieces and gluing or taping sandpaper to them. ■

—Andrew Dohan, Paoli, Pa.



The Wood Wright's Companion

By Roy Underhill, The University of North Carolina Press, Post Office Box 2288, Chapel Hill, NC 27514. ©1983.

189 pages
$19.95 in cloth
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"At its most basic level, this book is a guide to the making of the items described here," says author Roy Underhill. "Beyond that, though, these processes and products are keys to a deeper perception of the ways man relates to the material world."

Just one look at the photo of Underhill at work on the front cover tells you this man knows his stuff. Underhill, master house wright at Colonial Williamsburg, Virginia, has immersed himself in traditional woodcraft. Through his national public television series, *The Wood Wright's Shop*, Underhill has delighted thousands with his enthusiasm, wit, and skill (see his "Old Hand Ways" column on page 42 of this issue of *WOOD*).

This book reflects Underhill's gentle humor, with such chapter headings as "Crow Chasers and Turkey Calls," "Whimsy Diddling," and "Pitman's Progress."

The first chapter is devoted to searching for and buying old tools, restoring them, obtaining wood, and understanding some of woodworking's basic repetitive patterns. Next, he provides insight into forests and how they change. He also describes some major species of American trees. Other chapter topics are "helves and handles," the art of fitting wooden handles to metal tools such as axes, adzes, and saws; care and use of saws, whetstones, and planes; building wooden noisemakers, fences, window sashes, and wooden roofs.

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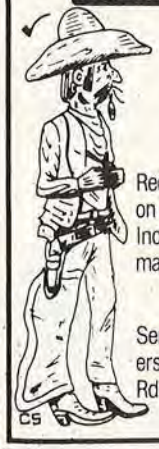

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Continued from page 42

The Old Hand Ways

going five full turns forward and five back, but is powerful and fast.

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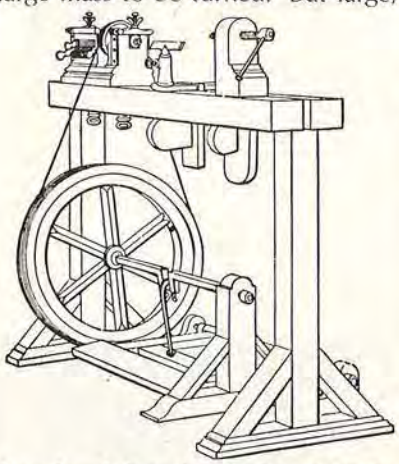
The great wheel

Bow and spring-pole lathes work amazingly well when there isn't a large mass to be turned. But large,



Spun by a helper, the wheel on this lathe could overcome weight of heavy stock.

heavy stock will have too much inertia to easily reverse direction on each go-round. The great wheel lathe solves this problem, but brings back another.

Simple but cumbersome, the 6-foot-diameter great wheel has to be spun by a helper. A belt runs across the shop to the lathe bed where it either wraps directly around the work or around a pulley on an iron axle, one end of which is spiked into the wood as a drive center. The great-wheel lathe has the advantage of high speed and torque, but again requires that you share the jug. When wind and water power were judged to be a cheaper source of power than wine, the modern industrial era began (sigh).

Lathes are beginnings—wheels from which other wheels are born. This is apparent in the shop of the wheelwright, the subject of the next "Old Hand Ways." ■

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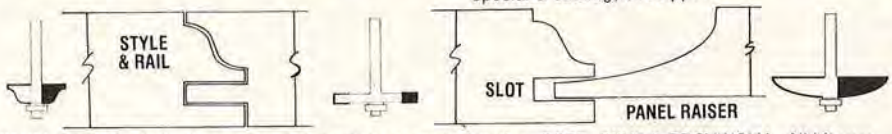

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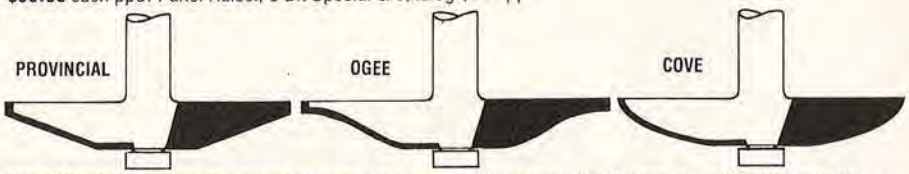

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carob: the modern chocolate substitute that once weighed diamonds

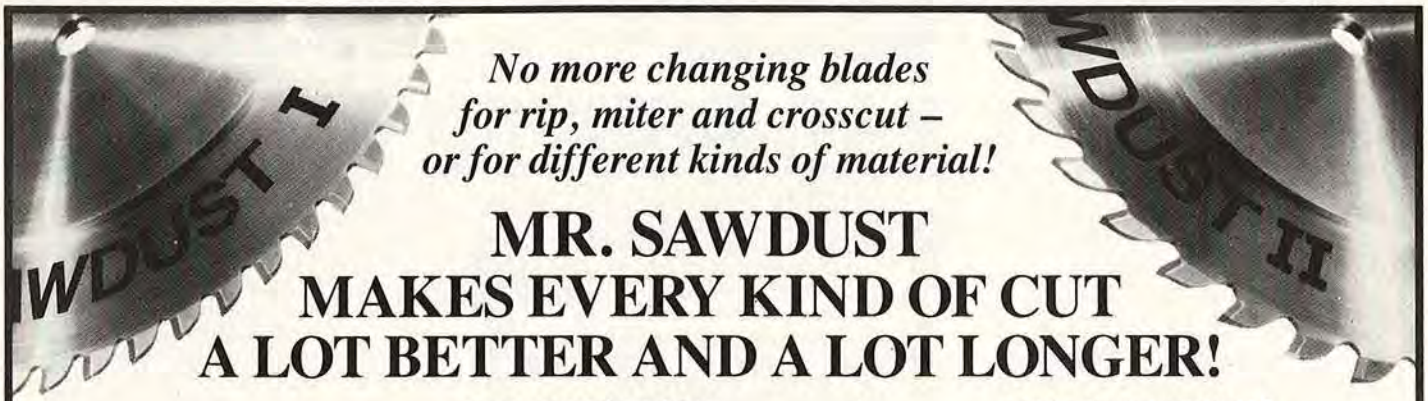
A small hardwood native to the eastern Mediterranean, the carob, or locust bean, tree *(Ceratonia siliqua)* produces pulpy, sucrose-rich pods up to 12" long. Because of the pod's natural sweetness and chocolate like flavor, it's become a favorite health food alternative. You'll find it in yogurt, wrapped as snack food "chocolate" bars, and in powder form similar to cocoa for hot drinks.

Using the carob pod for food isn't a 20th-century phenomenon. Where carob grows, the poor and hungry have always looked upon it as a staple—mashing pods for a vegetable or eating them raw from the tree. Egyptians extracted syrup from the pods, then fermented it as a royal liquor for their pharaohs. Even John the Baptist found nourishment in the carob pod during his sojourn in the wilderness, according to biblical scholars.

An ancient tree of biblical literature, the carob has become far better known for its seedpods than its wood.

As well-known as carob may be to health food advocates and Mediterranean peoples, its greatest fame stems from its association with precious stones. Ancient jewelers, seeking a standard weight measurement for gems, discovered the hard, heavy seeds of the carob pod. They began to use the seeds singly or in multiples to assign value to individual stones. Over the years, the term for these seeds evolved to become "carat," the now-universal weight unit for diamonds and other stones of value (one carat equals 200 milligrams).

With all its present uses, the large stands of carob found today in Israel, Lebanon, Syria, and other countries bordering the Mediterranean seldom become lumber. While some carob wood finds its way into turnings and small novelty items, the tree's small size makes it impractical for anything but producing pods. ■



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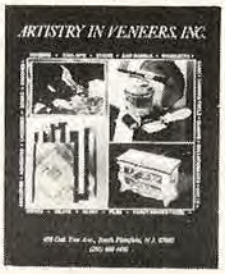

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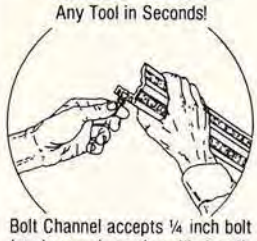

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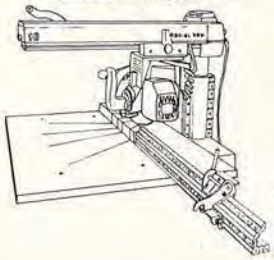

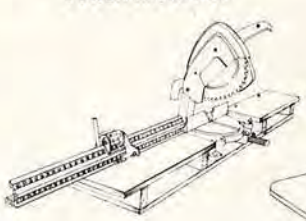

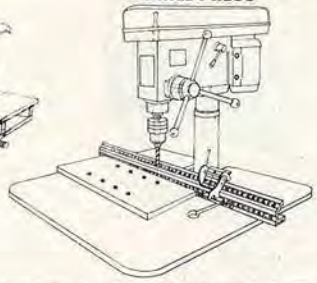

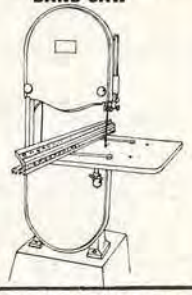

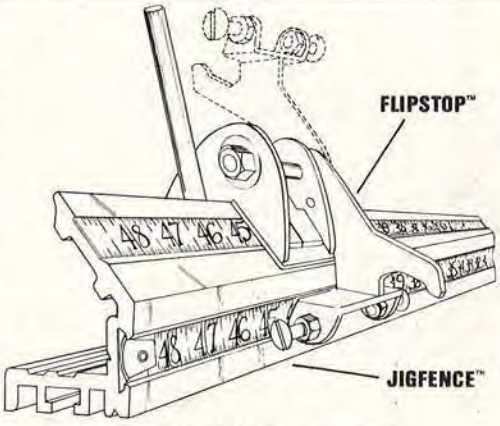

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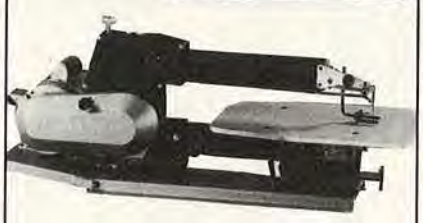

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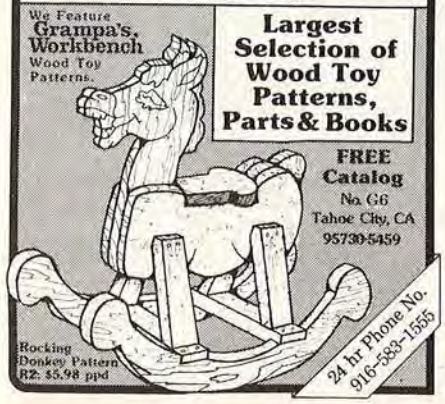

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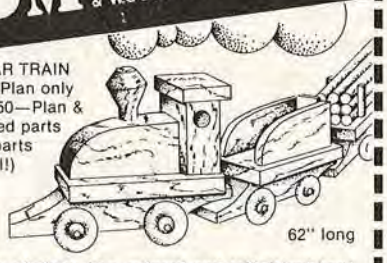

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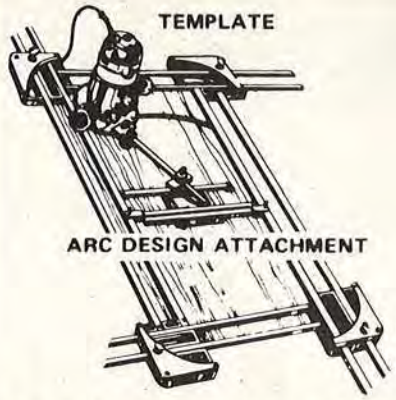

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OUR EDITORS INVITE YOU TO HELP THEM BY ANSWERING THESE QUESTIONS:

1. How many years have you been involved in woodworking?
   - A. ☐ Less than 1 year
   - B. ☐ 1 to 2 years
   - C. ☐ 3 to 5 years
   - D. ☐ 6 to 9 years
   - E. ☐ 10 years or more

2. Are any other members of your family involved in woodworking?
   - 1. ☐ Yes
   - 2. ☐ No

3. How many hours per week do you spend at woodworking?
   - F. ☐ None
   - G. ☐ 1 to 5
   - H. ☐ 6 to 10
   - I. ☐ 11 to 15
   - J. ☐ 16 to 20
   - K. ☐ More than 20

4. Do you have a workshop?
   - 3. ☐ Yes
   - 4. ☐ No

5. If so, where is it?
   - L. ☐ Garage
   - M. ☐ Basement
   - N. ☐ Attic
   - O. ☐ Spare room
   - P. ☐ Separate building
   - Q. ☐ Other

6. How big is it?
   - 5. ☐ 50 to 99 sq. ft.
   - 6. ☐ 100 to 149 sq. ft.
   - 7. ☐ 150 to 199 sq. ft.
   - 8. ☐ Over 200 sq. ft.

7. What's your level of woodworking ability?
   - R. ☐ Beginner
   - S. ☐ Intermediate
   - T. ☐ Advanced
   - U. ☐ Professional
   - W. ☐ Teacher

8. On an average, how much do you spend on materials for a project?
   - 9. ☐ $0 to $9.99
   - 0. ☐ $10 to $24.99
   - 1. ☐ $25 to $49.99
   - 2. ☐ $50 to $99.99
   - 3. ☐ More than $100

9. Which, if any, of the following have you done as a result of reading any advertisements in this issue of *Wood*?
   - W. ☐ Written or phoned to request more information about a product or service
   - X. ☐ Cut out an advertisement for future reference
   - Y. ☐ Sent away for a catalog or mail-order product
   - Z. ☐ Recommended the purchase of a particular product or service
   - A. ☐ Purchased a specific product or service
   - B. ☐ Showed the advertisement to other people
   - C. ☐ Other
   - D. ☐ None of the above

10. What do you usually do with your issue of *Wood* after you have finished reading it?
    - 4. ☐ Save the issue
    - 5. ☐ Loan it to friends or relatives
    - 6. ☐ Give it to friends or relatives
    - 7. ☐ Discard it
    - 8. ☐ Other

11. On the average, how long do you expect to keep your issues of *Wood*?
    - E. ☐ Less than 1 month
    - F. ☐ 1 to 3 months
    - G. ☐ 3 to 6 months
    - H. ☐ 6 months to a year
    - I. ☐ More than a year
    - J. ☐ Indefinitely

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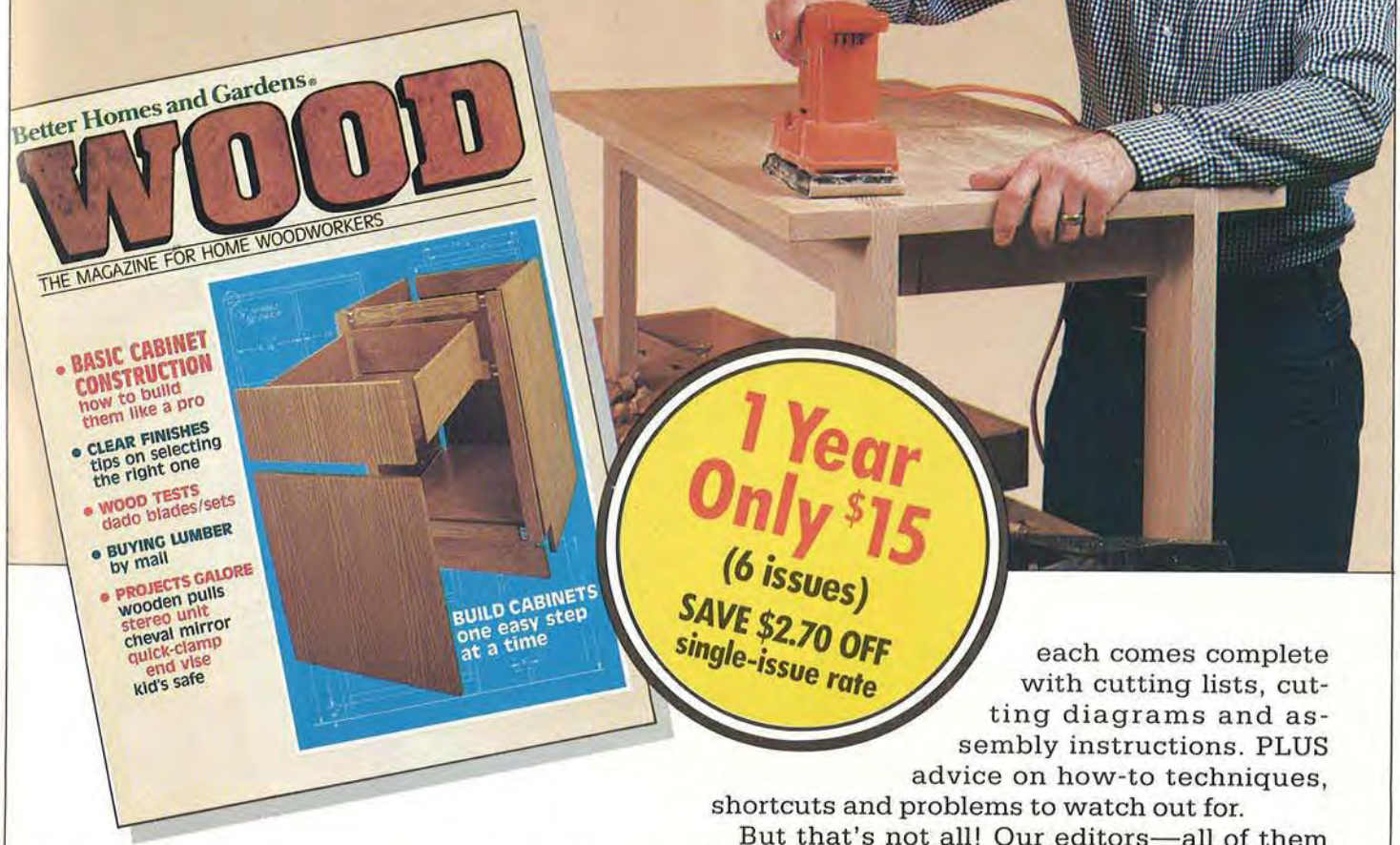
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Pint-Sized Picnic Table

Project Design:
Bob Sellers
Photograph:
Bob Calmer

ASSEMBLING THE TABLETOP

1. Using 2×4 stock, cut the tabletop pieces (A) and tabletop supports (B, C) to length. Using a combination square, mark, then miter-cut the bottom ends of the tabletop supports at a 45° angle where shown on the Tabletop Assembly drawing.

2. Rip a 30"-long strip of scrap stock to ⅝" wide, then cut it into 2" lengths. You'll use these as spacers in the next step to position the tabletop pieces (A) equally apart.

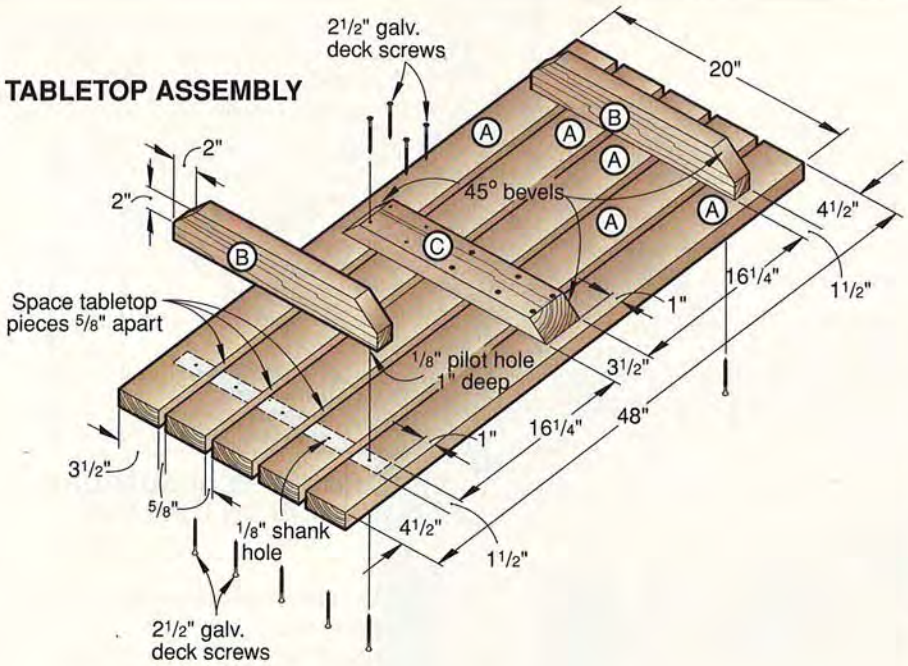
3. Choose the best face of the tabletop pieces (A) and lay them face down on the floor. (We look at the end grain, and position the pieces with heartwood side up. See the Tabletop Assembly drawing for reference.) Insert the ⅝" spacers between the tabletop pieces, and clamp the assembly together (make sure the ends of A are flush). Mark the center between the ends, then position and screw the center support (C) to the underside of the clamped-up tabletop assembly.

4. Turn the clamped-up tabletop assembly over, and position the outside tabletop supports (B) 4½" in from each end of the tabletop. Clamp the supports to the bottom of the tabletop. Drill pilot holes, and screw them in place. See the End View drawing for reference.

ATTACHING THE LEGS

1. Miter-cut one end of each of the legs (D) at a 40° angle, then cut the other end at the same angle to a finished overall length of 29".

2. Cut and miter-cut the seat supports (E), and seat boards (F) to length. See the End View and Front View drawings for reference.

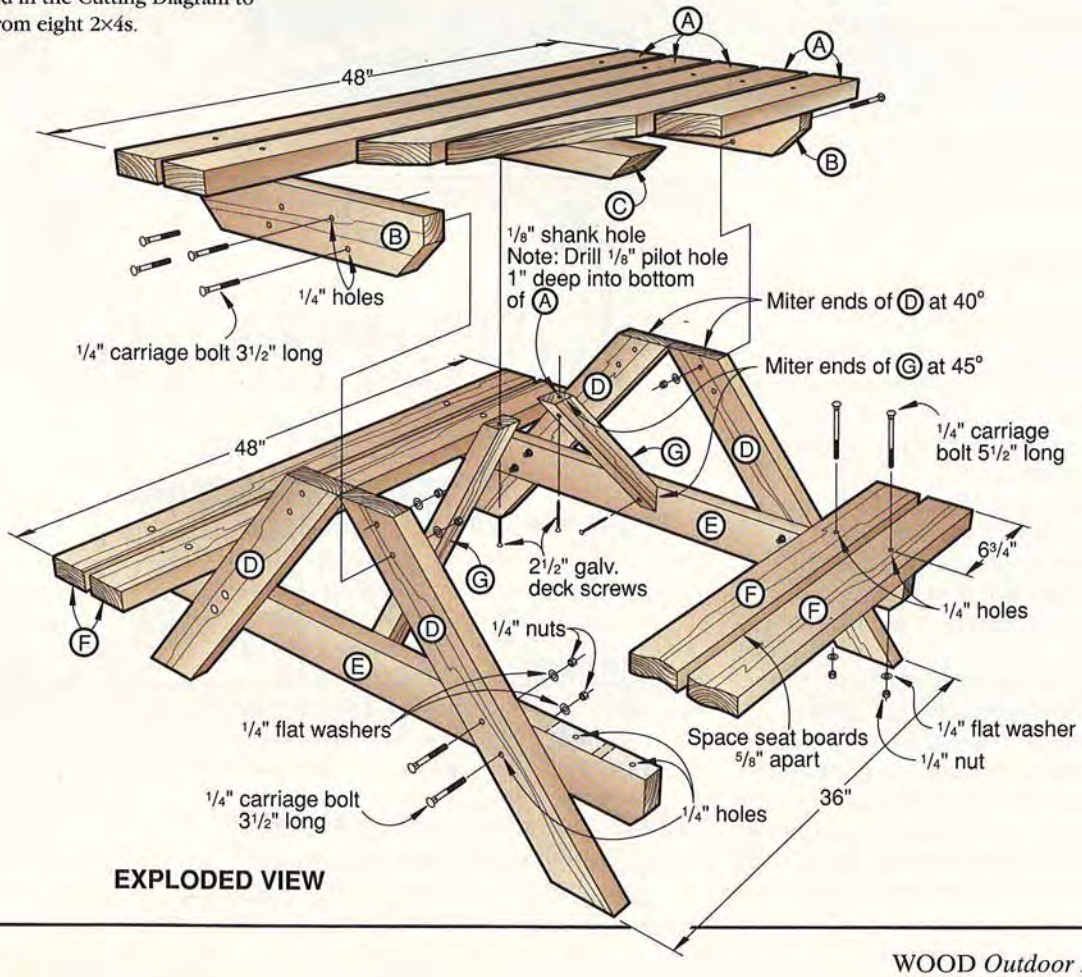


Bill of Materials					
Part	Finished Size			Matl.	Qty.
	T	W	L		
A tabletop pieces	1½"	3½"	48"	C	5
B supports	1½"	3½"	18"	C	2
C support	1½"	3½"	18"	C	1
D legs	1½"	3½"	29"	C	4
E seat supports	1½"	3½"	44"	C	2
F seat boards	1½"	3½"	48"	C	4
G braces	1½"	1½"	18½"	C	2

Materials Key: C–choice (pressure-treated lumber, redwood, cedar, or cypress)

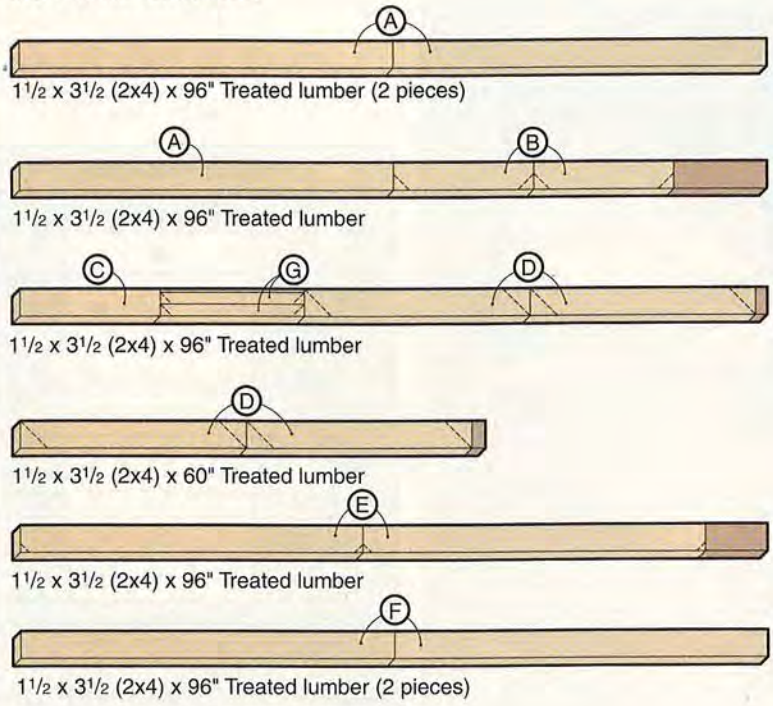
Supplies: 2½" galvanized deck screws, ¼" carriage bolts 5½" long with flat washers and nuts, ¼" carriage bolts 3½" long with flat washers and nuts.

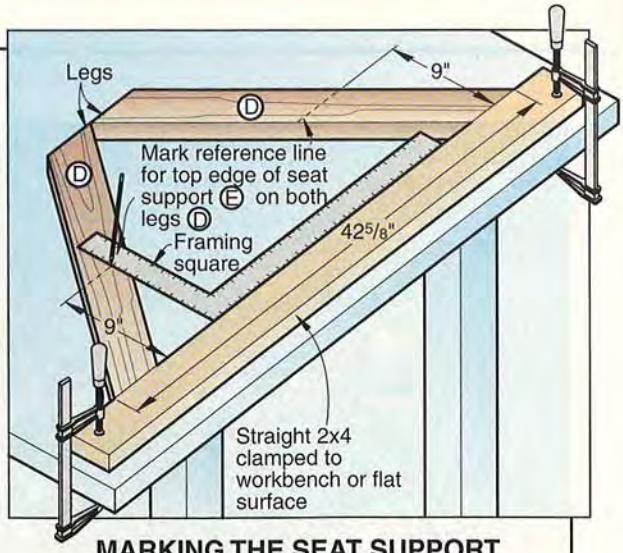
Note: We used pressure-treated lumber for this project, but you could use redwood, cedar, or cypress with equal success. The wood you choose depends on the final look you prefer and your budget for this project. Cut the pieces as indicated in the Cutting Diagram to get all the parts from eight 2×4s.



EXPLODED VIEW

CUTTING DIAGRAM


A
1½ x 3½ (2x4) x 96" Treated lumber (2 pieces)
A
B
1½ x 3½ (2x4) x 96" Treated lumber
C
G
D
1½ x 3½ (2x4) x 96" Treated lumber
D
1½ x 3½ (2x4) x 60" Treated lumber
E
1½ x 3½ (2x4) x 96" Treated lumber
F
1½ x 3½ (2x4) x 96" Treated lumber (2 pieces)



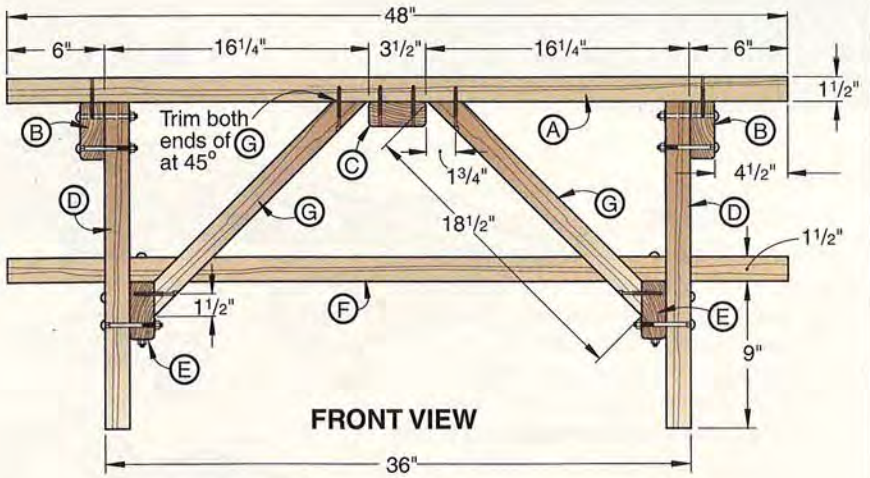
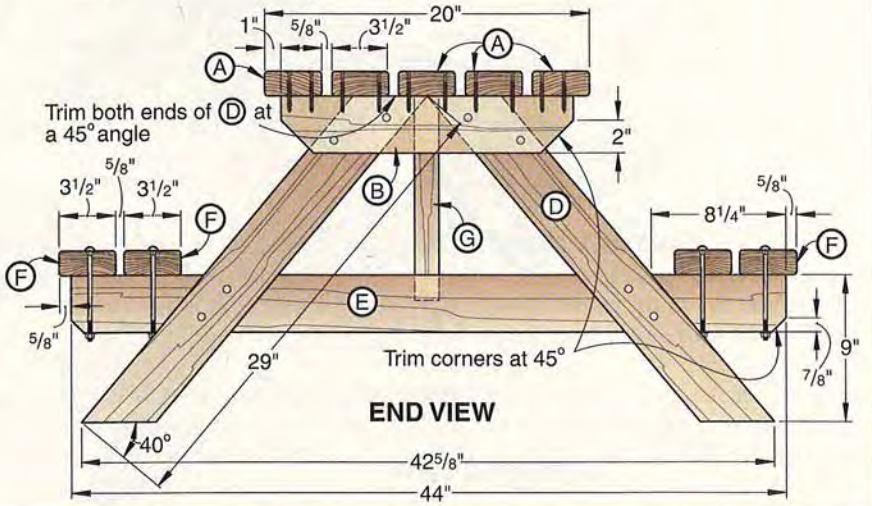
MARKING THE SEAT SUPPORT LOCATION ON THE LEGS

3. Position the two legs flush against a straight 2×4 on a flat surface where shown on the drawing titled Marking the Seat Support Locations on the Legs. Measure up 9" on each leg and mark a reference line for the location of the top edge of the seat support (E). Center the seat supports on the legs, drill ¼" holes, and bolt them in place.

FINAL ASSEMBLY

1. Clamp the leg assemblies to the inside of the tabletop supports where shown on the Front View drawing. Drill ¼" holes through the supports and the legs. Fasten the legs to the supports with ¼" carriage bolts 3½" long.

2. Clamp the seat boards (F) to the seat supports (see the End View drawing for positioning). Drill ¼" holes through the seat boards and supports, and then bolt the pieces together.

3. To further stabilize the table, fashion the diagonal braces (G) by crosscutting a 2×4 piece to 20" and ripping it in half. Miter-cut each end of the braces at 45° and to fit between the center support (C) and seat supports (E). Drill pilot holes and connect the pieces with deck screws where shown on the Front View drawing.

4. Using a belt sander or sanding block, round over all sharp edges. Finish, if desired, or let the wood age naturally.